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ABSTRACT

The first of four documents assesses the state of the art in the area of speech and language intervention for preschool handicapped children. It is explained in an introductory chapter that the report is designed to furnish an overview of existing programs and procedures which exemplify the field and identify critical issues which currently exist in a behavioral analysis of language intervention efforts for handicapped children. Chapter 2 reviews the intervention procedures for language related behaviors which include audiometric training procedures and the training of generalized imitation skills. Chapter 3 considers investigations where operant based intervention procedures and techniques have been applied to specific areas of linguistic behaviors (semantic development, morphology, syntax, spontaneous speech, and inappropriate speech and language). The purpose of Chapter 4 is to review and assess some of the more prominent comprehensive language programs currently available including the Illinois Program for Systematic Language Instruction, the Peabody Language Development Kit, and the Non-Speech Language Intervention Program. Described are the theoretical underpinnings of each program, the supporting data if available, prerequisite skills for entering the program, content areas, cost of purchase, source, and other information unique to the program. Chapter 5 addresses several of the conceptual issues which have served as areas for debate and controversy (such as the relationship between productive speech and receptive language, and the sequencing of linguistic structures). (Author/SBH)

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Language Intervention Programs and Procedures for Language Handicapped Children: A Review of the Literature[1]

FINAL REPORT - VOLUME I

by

Doug Guess, Wayne Sailor, and William J. Keogh[2]

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Table of Contents

		Page
Chapter 1:	INTRODUCTION	1
	Description of the Review Process	3
	Overview of the Report	4
Chapter 2:	PREREQUISITES TO LANGUAGE INTERVENTION PROCEDURES	8
	Infant Speech Sound Production	8
	Audiometry	9
	Generalized Vocal-Verbal Imitation	12
	Attention Training	18
	Implications for Severely Handicapped Children	19
	Conclusions and Recommendations	23
Chapter 3:	AREAS OF LINGUISTIC TRAINING AND REMEDIATION	26
	Semantic Development	27
	Morphological Development	39
	Syntactical Development	46
	Conversational Speech	55
	Remediation of Inappropriate Speech and Elective Mutism	60
	Conclusions and Recommendations	73
	Research Recommendations	74
Chapter 4:	THE EVOLUTION OF COMPREHENSIVE SPEECH AND LANGUAGE PROGRAMS	78
	Forerunners to Comprehensive Speech and Language Curricula	81
	The Miller and Yoder Curriculum	90
	Stremel and Waryas Curriculum	92
	MacDonald and Blott Curriculum	94
	The Bricker Curriculum	96
	The Language Acquisition Program (Kent)	100
	Guess, Sailor, and Baer Curriculum	102

The Illinois Program: Systematic Language Instruction (Tawney and Hipsher)..... 105

Language Development-Perceptual Motor Training Program (Flahive)..... 106

The Teaching Research Initial Expressive Language Program (McDonnel).. 107

Speech and Language Training Programs for Developmentally Disabled Children (Stewart)..... 108

The Peabody Language Development Kit (Level #P) (Dunn, Horton, and Smith)..... 108

Non-Speech Language Intervention Program (Carrier and Peak)..... 109

Conclusions..... 111

Summary Recommendations..... 112

Chapter 5: CONCEPTUAL ISSUES..... 114

Generalization..... 114

Sequencing of Linguistic Structures..... 122

Reception and Production..... 132

Program Selection..... 140

Recommendations..... 148

REFERENCES..... 149

PREFACE

During the period from September, 1974 through June, 1976 the present authors were awarded a contract from the School Systems Branch of the U. S. Office of Education to review language techniques and instruments, and language intervention programs and procedures for pre-school handicapped children. The contract was awarded to the authors through the Division of Mental Health and Mental Retardation of the Social and Rehabilitation Services Department in the State of Kansas. The Kansas Neurological Institute in Topeka served as the primary site location for the project. Sub-contracts were awarded by the authors to Earl Butterfield and George Cairns at the University of Kansas Medical Center, and to Tom Longhurst at Kansas State University.

In combination, the three language research and intervention sites directed efforts towards the accomplishment of the following three major goals: (1) the production of a comprehensive and analytic review of those foci of speech and language development literature most pertinent to the communication deficits of young, handicapped children; (2) the production of a computer-programmed information and retrieval library system integrating pertinent information of these foci; and (3) formulation of a research strategy, based on collation and analysis of these foci as well as ongoing research by project personnel, to yield a comprehensive assessment and intervention system for linguistically handicapped or potentially handicapped infants and young children.

Review and Analysis of Existing Literature

To accomplish this goal, groups from each of the three sites concentrated on the literature most appropriate to their specific areas of interest and expertise. Butterfield and Cairns from the University of Kansas Medical Center assumed responsibility for the review and critical analysis of literature of on-going programs pertaining to the assessment and detection of communication problems of the pre-linguistic period, and of existing early intervention and remediation

programs for infants. For purposes of identification, the pre-linguistic period is defined as that period of communication development up to the emergence of the first spoken word. Butterfield and Cairns have concentrated on the identification of precursors for normal speech and language development and a review of procedures and techniques for the early detection of handicapping conditions. Their review of the literature was complemented by on-going research during the project period which centered on procedures to identify high-risk infants.

Longhurst at Kansas State University assumed responsibility for the review and analysis of literature which described norms for linguistic development, and the identification and classification of assessment instruments and procedures to measure language development from the first word on. His assessment paradigm included a most thorough review of global tests and instruments, as well as those instruments and techniques oriented towards phonology, morphology, syntax, semantics, and basic concepts.

Guess, Sailor, and Keogh (Project Coordinator at the Kansas Neurological Institute site) undertook the task of identifying and reviewing speech and language intervention programs for children with handicapping conditions, and the identification of the skill level of persons required to implement these programs. Their review was complemented by ongoing research and program development at the KNI site appropriate to communication intervention efforts with mentally retarded children. Guess, Sailor and Keogh have not reviewed early infant intervention programs, since this area was also reviewed by Butterfield and Cairns in conjunction with their review and analysis of early identification procedures.

Each of the three project sites has prepared a final report covering the review, analysis, and identification of conceptual issues and problems appropriate to the above described areas of emphasis. These three documents, although separately prepared, were not written in isolation. Frequent meetings during the course of

the project were used to coordinate efforts in a manner to provide a reasonably complete review and analysis of the existing literature. Investigators from each site shared information and materials, discussed relevant issues, and planned the overall project strategy to meet the stated objectives of the contract. The sheer bulk of material reviewed and analyzed has warranted the preparation of the three separate documents which, from the opinion of all project personnel should be perceived as a series of interrelated reports covering a wide spectrum of key issues pertaining to assessment and intervention procedures and materials appropriate to communication problems among pre-school handicapped children.

Programmed Information and Library Retrieval System

A second major goal of the project has been to develop a comprehensive, computer-based retrieval system which contains approximately 3,000 entries from articles, books, programs, and materials which were reviewed during the course of the project. The reviews represent an accumulation of information from each of the three sites in accordance with the three foci of the project: (1) pre-linguistic assessment and intervention; (2) linguistic development and assessment; and (3) linguistic intervention.

Each entry in the retrieval system includes descriptive information of the particular piece of material reviewed and a comprehensive identification of the area of analysis most appropriate to the material.

Descriptive Information

The following major headings were used to describe pertinent information for each article, book, or training manual included in the retrieval system:

Reference. identification of the source where the material can be located. All references were listed according to APA format;

Availability. describes the material in its most up-to-date published or

unpublished form (i.e., book, journal article, commercial marketing, or unpublished);

Population. identification of the type of child described in the study or program. The classifications included children who were normal, emotionally disturbed, mentally retarded (with sub-classifications for educable, trainable, and severe/profound), deaf, hearing impaired, blind, orthopedically handicapped, and other;

Age. identification of the age of the subject or subjects described in the particular study or program;

Classification. identification of the material according to the categories of assessment, acquisition, training, experimentation, review, or other;

Instructional Setting. identification of the type of instructional setting described in the material. These included one-to-one, small group (2-4 children), and large group (more than four children) settings;

Persons Carrying out the Program. identification of the level and type of professional training of the person who implemented the study or program or the level of training of persons for which the program was intended. These categories included parents, teacher aides, peers, child care staff, school teacher, special education teacher, language trainer, speech clinician, psychologist, researcher, other, and not specified.

Area of Analysis

The area of analysis was divided into two major sections. Section A included studies and programs pertaining to assessment or acquisition, and Section B dealt with intervention programs and procedures. The following major and sub-headings for Section A (Assessment and Acquisition) are as follows:

Phonology. includes segmentals, suprasegmentals and distinctive features;

Morphology. includes pluralization, possession, tense, comparative/superlative inflections, and adverb forms;

Syntax. includes holophrastic speech, pivot grammar, negation, interrogation, pronominalization, reflexivation, passive tense, imperatives, conjunctions, and contractions;

Semantics and Basic Concepts. includes first word, vocabulary development, word association, word meaning, sentence meaning, nouns, pronouns, verbs, adjectives, articles, conjunctions, and prepositions;

Miscellaneous. includes private speech, adult-child interaction, sex, siblings, role-taking, memory, universals, innateness, attention, mediation, imitation, and intelligence.

Section B of the Area of Analysis describes training programs and intervention procedures. These are identified according to the following categories: audiometry, tone discrimination, speech discrimination, motor response, motor imitation, vocal imitation, verbal imitation, labels, pronouns, verbs, adverbs, adjectives, articles, prepositions, conjunctions, suffixes, inflections, negation, questions, articulation, spontaneous speech, vocal/verbal rate, and non-speech communication modes.

All content areas listed in both sections are further subdivided according to whether the emphasis is on expressive or receptive language. Also, approximately one-third of all entries in the retrieval system include an abstract of the article, a book, or program reviewed.

The computer-retrieval program has been developed by Clay Sutton, who was employed on the project at the Kansas Neurological Institute site. The program has the capability of retrieving reviewed materials by programming key words for any information in the material description section, and for any major or sub-heading in the area of analysis section. A manual written for the computer-based program explains how the system can be used for retrieving the desired information in accordance with the needs of the user.

This Users Manual is contained in a separate document along with data accumulated from the field-testing of the system at selected sites through the country.

Formulation of a Research Strategy

The third objective of the project was to formulate a research strategy for intervention with young handicapped children in the area of speech and language development. In essence, all three final reports address themselves to this issue. Each report includes a discussion of problem areas resulting from an analysis of the materials and programs reviewed. From the identification of problem areas, investigators at each site have proposed a program for future research needs based upon perceived deficiencies in the field. Investigators from each of the three sites have incorporated the research recommendations in a format which logically extends from their review of the literature.

CHAPTER 1

INTRODUCTION

Historically, the nature of speech and language acquisition has provided a focal point for considerable discussion, debate, and research among divergent theoretical approaches and schools of thought. Indeed, these controversies have intensified as a result of more recent efforts to develop remediation programs and training procedures for children who exhibit varying degrees and types of speech and language deficits. Not unexpectedly, the ensuing debate on how a child does acquire the most complex human behavior of spoken language has influenced the rapidly increasing number of techniques and procedures to teach communication skills to those children who are either speech delayed, or who show any number of aberrations in their speech production or language processing as a direct or indirect result of various handicapping conditions.

It is not the primary purpose of this report to in any way compare, discuss, or analyze divergent theoretical approaches concerning language acquisition, and the remedial programs and techniques which logically extend from a particular theoretical orientation. Other publications (c.f. Schiefelbusch and Lloyd, 1975) have more than adequately presented and discussed current issues and concepts which center around the development and acquisition of language. It is sufficient to conclude, however, that the process of language acquisition among normal children remains poorly understood and insufficiently documented within the confines of rigorous scientific investigation.

The sparsity of a solid, and empirically-based body of knowledge for language acquisition has not, however, precluded the development of remedial programs for language intervention--nor, indeed, should it! To the contrary,

efforts in language intervention can contribute immensely to the understanding of normal language acquisition. Such an observation was made well over a decade ago by Lenneberg (1964) when he stated:

> "It is precisely the area of speech disorders in childhood which can shed the most light on the nature of language development; and despite a very prolific literature, the most elementary observations have either not yet been made or the reports cannot be used reliably." (page 595)

Lenneberg proceeds to argue for more precise terminology and the collection of longitudinal data by clinicians who are working with speech disorders in children. However, if one were to make a judgment on the sheer number of language intervention programs in published or unpublished form, it might be concluded that data from these efforts would also go a long way in helping to clarify the nature of language acquisition. Unfortunately, despite the copious number of intervention programs available, no effort has been made to synthesize, analyze and review the data and results from them, either in the attempt to further clarify the nature of language acquisition, or to provide direction in the development of additional intervention programs and refining those which currently exist for handicapped children. It is this latter point which provides the basis for this report, the purpose of which is to assess the "state of the art" in the area of speech and language intervention for pre-school, handicapped children.

There exist two salient reasons for this review. The first is a pragmatic one based solely on an educational concern for providing speech and language training for the pre-school handicapped child. The practitioner is most generally not concerned with the theoretical underpinnings of a particular intervention program or procedure. The practitioner does rightfully expect, however, an effective program which can assist him or her in improving the communication skills of a particular child, or group of children. The present

review will help provide a basis for the selection of an intervention program or procedure for children who exhibit communication problems. This review is not, however, a cookbook for program selection. It is intended to furnish an overview of existing programs and procedures which exemplify the current status of the field. A second major consideration is the fact that this review will include mainly those programs and materials which have primarily a behavioral orientation, and which are data-based. The selection of only those programs and materials with a behavioral orientation is not intended to minimize contributions from other theoretical models to language intervention efforts. It is an attempt, however, to bring the review into a manageable proportion such that the body of knowledge from at least one theoretical position can be adequately assimilated.

The second major objective of this report is to identify critical issues and problems which currently exist in a behavioral analysis of language intervention efforts for handicapped children. Some areas of exceptionality will be identified where available intervention programs are virtually nonexistent, or where existing programs do not meet the needs of the population to be served. Further, there are certain critical issues which cut across all behaviorally oriented intervention programs as they are applied to handicapped children.

Description of the Review Process

The articles, books, and training programs referenced in this report were selected from an extensive literature review process convering a 22-month period. The initial task was to first identify and locate studies and programs which were potentially appropriate to language intervention among handicapped children. The procedure for identifying and locating the materials was multi-faceted. Over 25 journals were scanned separately, covering publications over the past

five years. All major books and program publishers were contacted for a listing of published materials relevant to the area of language intervention. Existing computer systems containing language intervention programs were utilized to procure reference lists. Personal contacts were made to individuals who the authors had already identified as having made contributions to the areas of language intervention. Finally, the references and materials already accumulated by the authors were included.

From this initial search, a card catalog was assembled which included the references for the published and unpublished materials identified in the initial search. Letters were sent to the principal author of the articles and papers requesting reprints of the material. Relevant books and published training programs were either purchased directly from the publisher or obtained on library loan. In some cases, the author of a particular training program loaned the materials for review. From this process, over 500 pieces of material were gathered. The authors do not presume to have located, procurred, or reviewed every published or unpublished language intervention program for handicapped children. We have, however, made a concerted effort to obtain as many relevant programs and procedures as possible within the structure of the described review process. In some cases, requested materials were not made available to us, either because the original authors could not be located, or because the requested materials were no longer in print.

Overview of the Report

This report is divided into five chapters: introduction; pre-language skill development; areas of linguistic training; comprehensive speech and language programs; and conceptual issues and problem areas. Recommendations for future research and program development for children with impaired communication skills are summarized at the end of each chapter beginning with Chapter 2.

Pre-language Skill Development. Behaviorally oriented language intervention programs have generally not been concerned with the identification of presumed cognitive underpinnings and biological/maturational determinants for speech and language development--areas which have traditionally been targeted as essential for the understanding of language acquisition. Behaviorists have attended primarily to the development and refinement of training techniques and procedures specific to the target behaviors to be taught and, only secondarily to the identification of skills and concepts which would potentially be prerequisite to the teaching of these target behaviors. The behaviorists have minimized the role of biological and maturational determinants in language acquisition, while emphasizing the environmental factors in the learning process. Thus, there has existed little, if any, distinction between presumed biologically determined "language readiness" skills and the more identifiable and observable skills selected as target behaviors for remedial programs. From a behavioral point of view, there may be certain skills which, if already present in the organism, would enhance the development of a more complex communication repertoire, but the absence of these skills need not await maturational development. Indeed, the behaviorists have attended to developmental sequences to the extent that complex behavioral repertoires are established from the chaining together of more basic responses.

Chapter 2 will be concerned with a review of the intervention procedures for language related behaviors which include audiometric training procedures and the teaching of generalized imitation skills. An argument will be made for a need to more extensively identify and assess a number of variables and parameters which may be contributing factors to the development of speech. This will be especially germane to vocal and verbal imitation training where data will be presented showing certain deficiencies in the intervention procedures

presently available for teaching generalized vocal imitation in some nonimitative children.

Areas of Linguistic Training and Remediation. A large number of studies have been conducted wherein specific linguistic concepts were taught to children who, prior to training, were assessed to be deficient in the targeted skill area. These studies, in toto, have had a most significant impact on the development of language intervention programs for handicapped children. All of the studies selected for review used research designs and methodology which clearly demonstrated the effects of the intervention procedures and techniques. As such, the studies have contributed significantly to the development and refinement of training techniques and procedures which are applicable to a wide spectrum of intervention programs in areas of linguistic usage other than those which were singled out for training. Additionally, these studies have served to demonstrate the applicability of a behavioral analysis to speech and language training. Significantly, these investigations show that speech and language behavior follows the same lawful patterns as do other nonlanguage behaviors where operant procedures have been applied. These investigations have demonstrated the controlling effects of contingencies in the development of selected linguistic skills, and the generalization of specific trained instances of a linguistic concept (or rule) to other instances of that concept which were not given direct training.

Chapter 3 will review investigations where operant based intervention procedures and techniques have been applied to specific areas of linguistic behavior. For purposes of organization, the chapter is divided into the following major areas: semantic development, morphology, syntax, spontaneous speech, and inappropriate speech and language.

Issues and Methods in Teaching Language to Handicapped Children: Curriculum Review. Within recent years a number of "comprehensive" speech and language programs have been developed for speech deficient children. These programs have evolved from varying theoretical positions, they differ with respect to content and structure, and they are written for quite different populations of children. Practitioners are continually faced with decisions concerning what type of program to select for their particular clients. These decisions are often based on inadequate information about the purpose of the program, the cost of the program, and the resources necessary to implement the training sequence. Additionally, the practitioner is often unaware of the empirical data base which supports the program as well as the explicitness of the instructions which must be followed for optimal success. The purpose of Chapter 4 is to review and assess some of the more prominent comprehensive language programs currently available. This review will describe the theoretical underpinnings for each program, the content areas of the program, the supporting data if available, prerequisite skills for entering the program, cost of purchase, where the program can be obtained, and other unique factors appropriate to each program.

Conceptual Issues. There exist a number of conceptual issues and problem areas which cut across all speech and language intervention efforts. Some of these problem areas bear directly on the construction and design of a particular program, other issues are more central to the very nature of language acquisition in both normal and handicapped children. In most cases, the issues are currently unresolved, awaiting much more extensive research and analysis. Chapter 5 will address itself to several of the more prominent conceptual issues which have served as arenas for debate and controversy among both language theoreticians and researchers. These include the issues of generalization, the relationship between productive speech and receptive language, and the sequencing of linguistic structures.

CHAPTER 2

PREREQUISITES TO LANGUAGE INTERVENTION PROCEDURES

Many of the existing strategies for speech and language intervention with the handicapped divide language instruction into two general phases. The first phase teaches behaviors that are considered important, or prerequisite, for functional language development to occur. The second phase teaches the symbolic, or functional, aspects of language such as semantics, syntax, morphology, etc. This discussion will focus on some of the variables that have been identified as being important "prelinguistic" behaviors. Special attention will be devoted to a portion of the literature that has investigated ways to teach prerequisite speech and receptive language skills to severely handicapped children.

Infant Speech Sound Production

Presently, there is no consensus on what constitutes all necessary prelanguage behaviors. There is general agreement, however, that if children can hear, discriminate between sounds, and reproduce (imitate) the speech sounds they hear others make, the most important prerequisite skills for later language development have been mastered. There is less agreement on the role of babbling, or the rate and diversity of spontaneous vocalizations, in the speech and language process. Spontaneous vocalizations made by infants obviously allow for the exercise of vital speech producing mechanisms. Logically, infants who are eventually going to be language users must be able to vocalize, and must be able to manipulate their sound-producing-mechanisms (e.g., tongue, vocal cords, etc.). The precise nature by which spontaneous vocal play functions as a speech prerequisite however, is not clear.

A second potential prerequisite for speech and language is auditory speech perception. Normal infants as young as six months of age are able to discriminate between different vowel-like sounds, between rising and falling voice frequencies, between speech and nonspeech sounds, and between male and female voices. Observations have shown that infants are able to make highly refined auditory discriminations long before they learn to imitate, or utter their first words. The extent to which this ability to discriminate such subtle differences in verbal behavior is a prerequisite (or even an enhancing factor) for later language to occur is also unclear. To our knowledge there are no studies that have systematically assessed the ability of language-delayed children to make these subtle discriminations prior to intervention. Research in these areas, as well as in areas that have already been extensively studied, needs to continue if an empirical basis for language intervention is to be the eventual goal of language theorists and practitioners.

Audiometry

Before any systematic language training begins, the usual procedure has been to insure that the language handicapped child is physically able to produce sounds and that he is able to hear the sounds made by others. The first assessment can be made without much difficulty: The physician examines the candidate for physical impairments of the speech producing mechanisms. Hearing assessments, however, have been considerably more difficult to make. The severely impaired child does not usually have a system readily available to tell the audiologist that a tone can be heard. Until recently, there were no efficient ways to determine if a severely handicapped child possessed sufficient hearing to be considered a likely candidate for speech and language training.

By combining conventional audiological techniques and operant conditioning principles, researchers have shown that it is possible to reliably assess the

hearing of severely handicapped children (Fulton, Spradlin, and Lloyd, 1968; Fulton and Spradlin, 1971; Spradlin, Lloyd, Horn, and Reid, 1968). The most successful audiological procedures have employed the selection of a response that is observed to be in the child's repertoire; then, teach the child to use that response as a signal that a sound is audible at certain Hz and dB levels. Usually a bar-pressing or button-pushing response is used because they are most adaptable with the currently used audiological equipment. However, any easy-to-observe operant may be used.

Lloyd, Spradlin, and Reid (1968) provided an excellent example of the effectiveness of operant audiological assessments. Their procedures were used with over 50 difficult-to-test mentally retarded children at the Parsons State Hospital and Training Center (Parsons, Kansas). Five interrelated phases were used to assess the hearing levels of the subjects. First, the subjects were given sweets and food items (i.e., pop, candy, bites of cookies, etc.) so that an effective reinforcer could be identified. Next, each subject was taken to the testing room and seated in front of an apparatus that housed a response button and a receptacle for reinforcers. Once the subject was seated and attending, a light appeared beneath the response button and at the same time a 500-Hz warble tone was presented as a discriminative stimulus array. Immediately after the onset of the stimulus array, the audiologist (or attendant) took the subject's hand and put the subject through the button-pushing response. A reinforcer dropped into the receptacle each time the button was pushed. Gradually, the subject began to press the button without prompting whenever the tone and light appeared. When button-pressing occurred only in the presence of the stimulus array (but never when it was absent), the subject's response was said to be under stimulus control of the stimulus array. If by chance the subject pushed the button when the stimuli were not present, their onset was delayed for ten seconds.

The next step was to gradually fade the intensity of the light until only the tone stimulus remained. At this point, the intensity and the frequency of the tone was varied across presentations in order to establish generalized responding to tones of differing frequencies and intensities. If the subject showed that he was able to generalize in this manner, the tone intensities were gradually diminished until the child no longer responded. The subject was then taught to wear earphones and the final phase of bilateral screening and threshold testing was completed.

In this experiment, the light and tone were presented as a stimulus array instead of presenting the tone alone. This strategy was used because the authors believed that by adding the light cue the subjects would be able to make the discrimination more quickly than if the tone was presented alone. Bricker and Bricker (1967) attempted to determine if the light was indeed an enhancing stimulus. These investigators designed several modifications of the procedures described by Lloyd, et al., 1968, and assessed the hearing of 33 mentally retarded children. One group of subjects received 50 pairings of a tone (1000 cps at 70 dB) and a white light. The intensity of the light was gradually faded across pairing trials until the tone was the only discriminative stimulus available. Another treatment group received discrimination training with only the tone operating as the discriminative stimulus from the outset. No light training was given to this group. The investigators reported that the results showed that the tone alone was an appropriate starting point for discrimination training and that the use of the light did not appear to enhance the ability to make the discrimination.

Several other demonstrations have successfully replicated the procedures described above. Not only are these procedures effective, they are relatively easy to implement. For those readers who are interested in a more detailed treatment of operant audiometric procedures, one volume in particular should be

especially useful: Audiometry for the Retarded: With Implications for the Difficult-to-Test by Robert Fulton and Lyle L. Lloyd (The Williams and Wilkins Company, Baltimore, 1969).

Generalized Vocal-Verbal Imitation

The importance of verbal imitation as a prerequisite skill for later language development is an almost universally accepted axiom. Theorists from divergent orientations agree that if a child can imitate the sounds and words of his community he is well on his way to becoming an effective language user. The precise extent to which imitation and reinforcement contribute to language development, however, remains a major issue for empirical research.

Operant conditioning techniques, in particular, have been used successfully to establish generalized verbal repertoires in previously nonimitative children. Typically, the strategy has been to present a model of the vocal stimulus to be imitated (e.g., "John, say MA MA"), wait briefly for the child to approximate an imitative response, and reinforce. Training usually continues in this manner until the child begins to imitate new models the first time they are presented. At this point, the child is said to have learned a generalized imitative repertoire and he is ready to learn that words can be used symbolically, or functionally.

Successful as operant procedures have been, most researchers and language teachers agree that more sophisticated ways must be developed to teach nonverbal children to imitate. The typical procedure (outlined above) is arduous and time consuming, requiring a language teacher to present the same vocal stimulus (e.g., "MA MA") perhaps thousands of times until the child begins to imitate it. Then, a second sound must be trained and brought under imitative control; then a third, and so on. This method of instruction may continue for months or even years, before the child becomes a skillful, generalized imitator.

Recognizing the need for more efficient ways to teach this important prerequisite skill, various training strategies have been used to teach language handicapped children to imitate. Baer, Peterson, and Sherman (1967) taught nonimitative retarded children to imitate a wide number of motor movements (e.g., the teacher raises her hand and says to the child, "Do this") before beginning training on vocal items. They reasoned that motor imitation training before vocal or verbal allows the teacher to physically assist the child through the desired imitation more easily than in the vocal mode. Sloan, Johnston, and Harris (1968), using much the same rationale as Baer, et al. (1967), also required their subjects to master motor imitations before training in the vocal mode, but they chose motor imitations that involved movements of the tongue and mouth. Once the subjects were imitating the motor movements (e.g., open mouth) training began to include a vocal component as well (e.g., the subject was required to open the mouth and say "AH"). Lovaas, Berberich, Perloff, and Schaeffer (1966) taught autistic children to verbally imitate by bypassing motor imitation and training a stimulus that possessed salient auditory and visual cues (i.e., MA instead of KA), reasoning that some children learn to discriminate sounds with visual (lip closure) and auditory components more easily than those with only auditory cues.

Many of the imitation training procedures in use today have not provided a sufficient rationale for the type of response (either motor or vocal) to be trained. For example, Tawney and Hipsher (1972) offer some guidelines for teaching verbal imitation, but use phonemes such as /k/, /b/, /al/. Probably, they appear as suggestions because in later phases of the Tawney and Hipsher program, the functional use of words containing those phonemes (i.e., ball) are taught. Consequently, the sounds selected during imitation training are dictated by the "functional" words that will be used later in the program. In

many cases of imitation training, attempts have been made to teach specific verbal imitations that have never been heard in a child's spontaneous vocal repertoire. Thus, children are required to emit new and often quite difficult phonological responses. Some sounds (e.g., "ah," "ka," "ee") seem to be quite simple to most adults, but actually require complex coordination between the various voicing and musculature structures. Obviously severely/profoundly retarded children have a considerably more difficult time trying to produce the even more complex responses associated with speech sound production. In the past, operant techniques, especially shaping, prompting, putting-through and fading have been invaluable tools in assisting severely/profoundly retarded children to learn specific utterances. However, for many nonimitative children, the language teacher might be premature in attempting to teach new sound production without first taking the necessary steps to ensure that prerequisites for the target behavior already exist. Sometimes the selection of phonological responses for imitation training might not always be the appropriate starting point, especially for children whose spontaneous rate and diversity of sounds is very low.

In the initial phases of vocal imitation development, Bricker, Dennison, and Bricker (1975) emphasized the importance of allowing the child to practice vocal chaining. Vocal chaining occurs when the child utters a sound which is then imitated by an adult and the adult's imitation is then repeated by the child. According to Bricker et al., (1975)..."In the early stages of imitation the child may respond only if he initiates the vocal chain." After repeated practice of the child-initiated vocal chains, the adult will be able to become the initiator, thus more closely resembling the imitation procedures already discussed. In the Bricker's procedure, however, vocal models are selected that the child has been observed to produce spontaneously. By utilizing the child's

spontaneous vocal repertoire as the primary indicator of what vocal models should be trained, the procedure ensures that the child possesses the phonological-response prerequisites necessary to physically produce the responses; the task then is to bring the responses under imitative stimulus control. This selection strategy differs somewhat from those discussed earlier that emphasize the auditory/visual components of vocal models to be trained. A study conducted by Keogh (1974) supports the Brickers' vocal-model selection strategy. In this study, a seven year old severely retarded boy was taught to imitate sounds that appeared in his spontaneous repertoire. The procedure involved tape recording a baseline of spontaneous utterances during free play sessions, then rank ordering them according to their frequency and diversity. Three categories of sounds were selected as models for imitation training: 1) sounds that occurred at relatively high frequencies in the child's spontaneous repertoire, 2) sounds that were of relatively low frequency, and 3) sounds that were never spontaneously uttered by the child. All categories were trained in a standard way (i.e., modeling, shaping, chaining and reinforcement). The results showed that the child learned to imitate sounds that were of high frequency in his spontaneous repertoire but he did not learn to imitate the sounds that were absent from his vocal repertoire. In a related study, Turnbull (1974) compared the two methods of vocal stimulus presentation in teaching a generalized vocal imitation skill to two 18 month old normal infants. The procedure consisted of gathering baseline data on the rate and diversity of vocalizations of each infant; these sounds served as vocal models during the Child-Produced imitation training condition. In the other (Experimenter-Produced) condition, the experimenter's voice was presented as the vocal model via tape recordings. Reinforcement followed correct approximations of all of the taped vocal models. To assess whether generalization occurred, vocal models that were never trained were systematically

introduced throughout training. Responses to these items were never followed by reinforcement. The results showed no differences in acquisition between the two imitation training conditions, but the probes showed that both subjects generalized, to a greater degree, during the Child-Produced condition than during the other condition, suggesting that child-produced utterances might bring about generalized imitation more quickly than experimenter-produced sounds. Of course, the practicality of selecting vocal stimulus items for imitation training from the child's own vocal repertoire depends 1) how reliably they can be obtained, and 2) how many baseline sessions are needed to collect a representative sample of the child's spontaneous vocal behavior. These factors need to be assessed in relation to other commonly used methods for selecting vocal models for imitation.

Another characteristic of imitation training involves response functionality, or, the relationship of a response to the consequences it produces. Traditionally, most imitation training procedures have included motor responses in isolation from some larger response chain. These responses provide little in the way of "inherent" reinforcement. For example, in the course of their daily interaction with the environment, children would have little reason to touch a table for the sole purpose of touching a table; they would likely stand up only as part of a larger gross motor chain to move from place to place; and they would likely clap their hands only when expressing delight or showing approval of the performance of others. A review of the imitation training literature shows that the responses usually used in motor imitation training are not intrinsically useful or reinforcing to the child; thus their teaching requires the use of additional "artificial" reinforcers (e.g., food, liquids) both to establish and to maintain them.

Functional responses on the other hand would be those that have "a built in" and an immediate natural consequence. Examples might be turning a radio knob (response) to hear music (consequence), pressing a lamp's button (response) to light a room (consequence), etc.

As more and more comprehensive language training strategies appear in the literature, the issue of how and where to interface (or sequence) imitation training as part of the "total-language learning" process become more pronounced. The traditional operant view has been to teach all of the prerequisites needed to perform the more conceptually difficult language tasks. This strategy teaches a child to be a proficient generalized imitator before simple labeling training is begun--a strategy most observers would agree is fruitful. However, it may be equally fruitful to consider alternative ways to program imitation and language concepts.

For a child to become a proficient generalized imitator, it is likely that hundreds or even thousands of training trials need to be conducted. This is especially true when severely and profoundly retarded children are introduced to imitation training. In essence, the imitation training model teaches the child to "DO AS THE TRAINER DOES," or, in effect, "Speak only when you are spoken to." In fact, the child is often required to refrain from spontaneous babbling, to sit quietly, and to look into the face until the discriminative stimulus is presented (i.e., "SAY BA"); then, the child has approximately five to ten seconds to attempt an imitation of the vocal model. Stimulus control of the child's utterances is achieved when the child is responding only after the discriminative stimulus is presented. It is possible that while this procedure is effective in teaching a generalized imitation skill, it operates against the spontaneity of language use expected later in the language training process. Frequently, the "Speak only when spoken to" strategy remains intact

well into the more advanced phases of language training, where the "Do as I do" discriminative stimulus (operating during imitation training) becomes "WHAT'S THIS?", "POINT TO" or "FIND THE..." Unless the language training curriculum specifically arranges the contingencies of reinforcement to accommodate the spontaneous use of the newly acquired language concepts, it is likely the child will seldom use the language skills in a spontaneous manner.

Many language training programs, of course, attempt to arrange the environment to minimize the potential detrimental side effects of the strategy mentioned above. For example, the Environmental Language Intervention Strategy (MacDonald and Blott, 1974) programs imitation, conversational, and structured-play training concurrently so that the child will begin to use the newly learned grammatical structures functionally as soon as they are mastered imitatively. In general, however, the manner in which imitation training is programmed as part of the "total communication" process warrants continued study.

Attention Training

Before the teacher can effectively teach, he or she must see that the student attends to what is to be taught. The ability to "pay attention" may be considered a prerequisite skill that is necessary for successful participation in any language training class. "Attention training" has been included as a usual starting point for most language training programs, particularly those that have been designed to teach very low functioning children.

O. Ivar Lovaas (1967) was among the first to apply operant conditioning procedures to remediate and to develop language behavior in severely handicapped children. He concluded that before new socially desirable behaviors could be taught, tantrums, self-destructive, and self-stimulatory behaviors needed to be eliminated.

The efficacy of attention training procedures per se must relate to the length of time it takes to bring a child's attending behavior under control. If it is accomplished in a relatively short period of training time, then its value as a legitimate training step would be considered an insignificant issue. However, if many weeks or months need to be invested specifically into "Attention Training" procedures, then alternative ways to by-pass attention training might be useful.

Typically, attention training includes shaping the child, through successive approximations, to sit quietly in a chair, to maintain eye contact with the teacher, and to suppress stereotypes or self-stimulatory behavior. Usually, the teacher presents a verbal cue such as "Look at me." setting the occasion for appropriate attending behavior. When the child regularly attends to the teacher for five to ten seconds after the request to "look," the child has mastered the attending prerequisite.

Possibly a more efficient approach would be to bypass attention training sessions in the expectation that attentiveness would be shaped as part of the training task, whereby both responses would be brought under the control of the same discriminative stimulus.

Implications for Severely Handicapped Children

Data on speech and language development in normal children have shown that children as young as a few months of age are capable of making very subtle auditory discriminations. As they grow and develop, the opportunity to practice discriminating, or processing auditory stimuli consumes a portion of their waking hours. For other children such as the severely or profoundly retarded, the ability to make subtle auditory discriminations might be considered more primitive or lacking altogether. The extent to which "auditory-discrimination" practice is a prerequisite for verbal imitation to be mastered is unknown.

Lovaas (1971) provided some data on discrimination training with normal, autistic, and mentally retarded children. Although it was not specifically directed toward imitation training or language training, the study might be useful to review here since its implications may bear directly on the language learning process with seriously handicapped children. Six of the children who participated had been diagnosed as autistic; five were diagnosed as mentally retarded; and five were considered normal. Initially, all of the children learned to press a bar in the presence of a stimulus array. The bar pressing response was reinforced with candy, potato chips, etc. The stimulus array was composed of four components: 1) a visual stimulus (a 150-watt floodlight); 2) an auditory stimulus (white noise at 63 dB); 3) a tactile stimulus (a blood pressure cuff fastened to the subject's leg); and 4) a temporal cue (the array being presented every twenty seconds for a duration of five seconds). Thus the initial discrimination occurred when the subjects reliably pressed the bar immediately after the onset of the S^D but not at other times. All of the subjects learned to make this discrimination; then, only one component of the array was presented at a time. This test was designed to determine if the stimulus array was processed as a unit, or if one or more of the stimulus components served as the $-S^D$ with the other being irrelevant. The results showed that all of the normal children process each stimulus component equally well; the autistic subjects responded to one dimension of the array but not to the others; and the mentally retarded subjects responded somewhere between. The study further showed that discrimination training conditions could be arranged to render the "nonfunctional cues" functional when separately trained.

These findings have direct implications when considering traditional imitation training procedures. In fact, Lovaas et al., (1971) discusses the acquisition of "AH" and "Mm" imitations by an eight year old autistic child in relation

to the "overselection" of stimuli. Almost 2000 training trials (presented in the traditional manner) were required before the child began to imitate correctly. Both vocal models contained visual as well as auditory cues. When presented together, the child was able to imitate successfully; when the visual cues (sight of the trainer's mouth) were removed, the subject's performance fell to zero. Although Lovaas' observations were directed toward the discrimination capabilities of autistic children, the questions he raises are equally apropos to all severely handicapped children. They are..."are the children particularly unresponsive to auditory cues? Are they unresponsive to auditory cues when these are presented together with visual cues? Do they have difficulty attending to any one cue in a multiple cue input, etc.? (p. 212)."

The imitation training strategies discussed here represent the major ones in use today. So far, there is very little evidence to suggest that one strategy is more effective than another. They all work for some children; however, it is also true that none works for some other children. For children who do learn to imitate as a result of direct imitation training, it is possible that they, similar to normal children, had prior experience discriminating sounds occurring in their environment; for children who fail to become generalized imitators, it is also possible that they (for some reason) do not develop the ability to discriminate sounds: they must be specifically trained to do so. One method to train the severely handicapped to process auditory stimuli would be to design a curriculum based on current operant audiological procedures before commencing on the production of vocal imitation training. By examining the child's response rates when such a curriculum is employed, it would be possible to assess whether the child had learned to receptively process and discriminate the various auditory stimuli that will be trained later productively.

Unfortunately, there is a scarcity of data to allow for an accurate estimate of the percentage of children who fail to learn to imitate after standard imitation training procedures are used. Practitioners and theorists would probably agree that the number is sufficiently high to warrant a closer examination of imitation training procedures and prerequisite processes. Bricker et al., (1975) have emphasized the importance of Piaget's sensorimotor period in their language training curriculum, believing that this period represents a stage upon which all later learning is based. They have stated that the development of language is interrelated and dependent upon the development of other complex skills such as sensorimotor intelligence, motor coordination and concept acquisition. Thus, the infant's interaction with his environment (i.e., sucking, tracking, grasping) can be seen as a basis for later language development. One interpretation of this view is that little more than a rudimentary communication system can be trained in language deficient children unless they are exposed to the sort of environment (i.e., sucking, tracking, grasping) that Piaget has observed to exist during infants' early development. Programs based on this view must be thoroughly comprehensive so as not to exclude "unknown" prerequisites. With such a comprehensive approach, the possibility exists that a considerable amount of time might be spent developing behaviors that are irrelevant along with those that are indeed prerequisites. This strategy, however, can be subjected to no more criticism than other programs following a more specified approach. The major measure of accountability rests on the success rates each approach experiences in teaching children to become skillful imitators, and eventually, speech and language users in their respective communities. Until one or more trends clearly emerge to empirically show that a particular strategy is more likely to teach the necessary prerequisites for later language use than others, we can continue to expect widely diversified prerequisite training processes.

Conclusions and Recommendations

This chapter surveyed intervention procedures that are commonly used to teach speech and language prerequisites to language handicapped children. The survey suggests that relatively few prerequisite training procedures exist. Most of them are concerned with developing imitative behavior. The heavy emphasis on imitation training procedures probably reflects what is known and what is yet-to-be-known about speech and language prerequisites. There is some consensus that the ability to imitate is one of the important prelanguage prerequisites. How and where to program imitation training procedures remains an issue, as well as the need to identify and program "unknown" prerequisites. The research community (both theoretical and applied) needs to shift emphasis, not away from imitation entirely, but to include imitation procedures as part of a more global ecological process that encompasses the "yet-unknown" language prerequisites.

Several training strategies exist to bring about a generalized vocal imitative skill. Experience suggest that they all work for some children; however, it is also true that none works for some other children. The KNI laboratory has found that some children do not learn to imitate vocally even after years of training. These circumstances are not unique to KNI, and we, like other language research laboratories, must begin to take a closer look at why some children fail to imitate. We propose that there are several potentially useful areas of research that address this problem. Some will be identified below:

Response Functionality - Traditionally, most imitation training programs include such motor responses as "touch the table," "clap hands," "stand up," etc. These and similar responses have limited or no utility for the child in most situations. It can be hypothesized that responses such as these possess little intrinsic value, thus their teaching requires the use of additional artificial reinforcers.

Furthermore, these responses are not likely to occur frequently in the child's daily interactions within the more global ecological stimulus-response schemes. Functional responses, on the other hand, are those that have their own immediate (usually natural) consequences. Examples might include turning a radio knob in order to hear music, lifting a glass and drinking a refreshing liquid, etc. These observations suggest an avenue of research that identifies functional and naturally occurring responses that can be shaped and strengthened within the ecological stimulus-response scheme.

Reinforcer Specificity - Reinforcer specificity is inextricably encompassed in the above discussion; however, it lends itself to consideration in its own right. In the previous section, (a), the point was made that traditional imitation training procedures do not usually provide a reinforcing consequence specific to a particular response. That is, the consequence is the same (M & M, chips, etc.) for many responses that are to be brought under imitative control. It is possible that more rapid discrimination learning would occur if specific reinforcers were delivered for a specific imitative response. Instead of delivering an M & M each time the child attempts to imitate /ba/ and /eat/, a consequence specific to each imitation might be provided (i.e., a ball to play with for /BA/ and food with /eat/).

Response Selectivity - Many language theorists believe that the child's spontaneous vocal repertoire indicates the best initial selection of vocal stimuli for training for that particular child. This implies that an assessment be made of the way the child is behaving vocally in his natural environment. Suppose that the child was heard to spontaneously vocalize the phonemes /KU/ and /BO/ instead of those suggested above (in b). These sounds, then, might be selected for imitation training, assigned reinforcers specific to each response (i.e., KOOL-ADE for /KU/ and a toy boat for /BO/ which, by design, provides each sound

with a function. This strategy provides an alternative to traditional imitation training procedures which might enable previously failing children to succeed.

Data on speech and language development in normal children have shown that children (as young as a few months of age) are capable of making subtle auditory discriminations. As they grow, the opportunity to practice discriminating, or processing auditory stimuli consumes a considerable portion of their waking hours. For the severely or profoundly retarded child, this ability might not be present. The extent to which "auditory discrimination practice" is a necessary prerequisite for an imitative repertoire to develop needs to be documented, and procedures (probably based on operant audiometry) should be designed to ensure that auditory discrimination training is provided.

The importance of Piaget's sensorimotor period in the language prerequisite process warrants a more thorough analysis. It has been suggested (Bricker, et al., 1975) that language is interrelated and dependent upon the development of other complex skills such as are observed to exist during sensorimotor period.

It has been generally agreed that the sooner a debilitating condition is identified in infants, the greater the prognosis for success. Reliable assessment procedures that identify language deviance in infancy must be found before the existing technology can provide a mediational program for this population.

The "speak-only-when-spoken-to" phenomenon might operate as a debilitating discriminative stimulus when language mediation is considered in a global sense. This phenomenon might exist because language training programs have typically programmed training sequentially rather than concurrently. Researchers and practitioners need to look more closely at the language user's total environment and commense training in such a way that more closely approximates that environment.

CHAPTER 3

AREAS OF LINGUISTIC TRAINING AND REMEDIATION

There is an extensive literature of experimental studies and case reports pertaining to the training of specific linguistic skills and concepts. This chapter is intended to identify and review selections from among these studies and to discuss some of the central issues that have evolved from them. It should be stated at the onset that the studies reviewed represent a diversified sample of intervention procedures which are applied to a wide array of linguistic areas; which lie across several different subject populations; and which cover a fairly wide age span. Additionally, these studies include children with little or no speech, as well as those with considerable verbal proficiency. Some of the studies describe intervention procedures which are conducted on a one-to-one basis while others include procedures and techniques which have been implemented on a group basis. The level of training of the "therapists" varies extensively from skilled researchers to relatively untrained nonprofessionals. The range of settings where the studies were conducted include classrooms, homes, clinics, institutions, and university-based laboratories.

In essence, this chapter includes studies and investigations with a large array of variables and parameters. Each of these variables, by itself, constitutes a fruitful area for systematic research. Nevertheless, there are some obvious and very central issues appropriate to language intervention efforts which, however indirectly in some cases, cut across all of these areas.

For purposes of organization, the chapter is divided into five parts: semantic development, morphological grammar, syntactical development, spontaneous speech, and remedial speech. Of course, many of the studies reviewed overlap within the identified categories.

I. Semantic Development

The central issue is the teaching of referents to children. Referents are basic word labels used by the child to indicate receptively and expressively, functional usage of those labels appropriate to the observable attributes of objects or events. Reference assumes that the primary function of language is symbolization. This implies that there exists a convenient "linguistic" (symbolic) event which can be responded to, and responded with, in much the same manner as one would respond to or with some "real" (experimental) event. When the convenient events are words, an immense gain in control of the social world is achieved for the word user, for then word users may exchange words with each other to manage their mutual interactions. The exchange of words is much more convenient, and can be much more efficient, than the direct teaching of others to help in dealing with the world. A referent is used in many contexts, such as the labeling of objects, the description of actions, the identification of ownership (possession), the attributes of objects (e.g., color, texture), the relational properties between objects such as size, weight and position. Referents, or words, have meaning through function. Semantic development is concerned with acquisition of referential skill.

Labeling. A number of case studies have reported the use of basic operant procedures to establish "labeling behavior" in children. These studies typically teach verbal imitations of the target words prior to establishing the imitations as functional word referents. In one of the earlier studies, Sapon (1966) presented an excellent account of the use of behavioral principles to establish appropriate verbal behaviors in a ten year old non-speaking child of subaverage intelligence. In this study, vocal imitations were extended to verbal referents in the form of single word labels, and later to the development of phrases and

short sentences. Five years later, Buddenhagen (1971) gave a lengthy account of his attempts to teach four Down's Syndrome children verbal imitations and simple requests. First, he described some of the problems faced by language deficient children residing in institutional settings, and then discussed the use of operant procedures as an effective strategy to remediate behavior deficits. Finally, he presented several case studies in which he described the individualized training programs to teach first vocal/verbal imitations and then requesting skills. In general, the author's strategy was to pinpoint the extent of each child's existing vocal repertoire, select a reinforcer, expand the child's existing vocal repertoire through prompting and fading techniques, and then to transfer control of the subjects' newly acquired repertoire from his models to appropriate environmental stimuli. The author reported that all subjects made gains in the training sessions, although to varying degrees; that performance did not generalize to other settings; and that the subjects began to demonstrate other "skills" not directly related to language training shortly after language training had started.

Marshall and Hegrenes (1970) described a program for developing attending behavior, motor imitations, and functional vocal and verbal responses in four autistic, mentally retarded children ranging in age from six to fourteen. The responses included object labeling, descriptions of verb actions, requesting behaviors, the use of the pronoun "I" and so on. The operant techniques of modeling, fading, prompting, and shaping, were described in relation to selected target behaviors for each of the children described.

Sulzbacher and Costello (1970) presented a comprehensive case study of a behaviorally oriented treatment program for a six year old autistic child. This well-documented case study also included areas other than language training.

Other studies using operant procedures to establish basic referent labels include Blake (1969), Drash and Leibowitz (1973), Acker, Kelley, Mason, and McAmmond (1973), and Sloane, Johnston, and Harris (1968).

Several authors have described procedures for training parents as the primary therapists in basic concept development programs. Goldstein and Lanyon (1971) taught parents the use of modeling and reinforcement procedures to improve the speech skills of a ten year old boy diagnosed as autistic. Training was successfully conducted to improve the articulation of words, labeling, and simple phrases. Parent training consisted of several short reading assignments appropriate to behavior modification techniques, role playing, and weekly supervised meetings. The clinician directed the content of the program and assisted the parents with procedural problems.

One of the more impressive home-based intervention programs to develop basic concepts (as well as more extensive grammatical utterances) was described by MacDonald (in press, 1976); c.f. also, MacDonald and Blott, 1974; and MacDonald, Blott, Gordon, Bernard, and Hartmann, 1974. MacDonald described an environmental language intervention approach which places the parent in the role as the language trainer who first assists in identifying the concepts to be developed, and then serves as the primary person who conducts the home-based intervention program. The work of these authors is extensive, well-documented, and most promising in that they capitalize on the child's home environment as the setting where basic referents can be taught within the context of naturally occurring contingencies and language related opportunities. This is contrasted with attempts in large institutional settings where often, by necessity, basic semantic development is attempted on a group basis (c.f. Phillips, Leibert, and Poulos, 1973; Guess, Ensminger and Smith, 1969).

The majority of studies presented so far have successfully used a variety of behavioral techniques and procedures to describe intervention programs where basic speech referents were trained. Numerous other studies of a similar orientation have been published in which specific behaviorally oriented procedures have been successfully used to teach basic concepts to children. Successful intervention alone, however, is not sufficient. Practitioners are fully aware of the many instances in which success does not occur, or is only partially realized. Researchers are cognizant of the fact that there are numerous areas of conceptual development that need much more extensive investigation. The following research studies serve to point out some of these areas of analysis.

The Brickers and their colleagues have conducted several experiments dealing with receptive vocabulary development in both young normal and severely retarded children.

Bricker and Bricker (1970) used a two-choice discrimination task to assess receptive vocabulary learning with severely retarded children which were divided into learner and non-learner groups, as determined by pre-training performance on a similar task. Results indicated greater acquisition for those subjects identified as learners when a structured training approach was used, as compared with a random approach. The structured approach involved a sequential presentation of the object across trials; i.e., the object was presented on consecutive trials with distractors. The random approach was one in which objects were not presented on consecutive trials. Neither approach was effective for the defined non-learner group which performed no better than two untrained control groups--one a do-nothing group, and the other a group which was exposed to the objects but not given systematic training.

The same authors (Bricker and Bricker, 1971) conducted another investigation to assess receptive vocabulary as a factor in the discrimination performance of low functioning retarded children. The purpose of this study was to compare the use of object names with no names in teaching the subjects to point to variously colored geometric forms. Initially, 30 mentally retarded children were pretested and then divided into three groups. One group was trained to receptively identify the objects by listening to the trainer name the objects to be selected, by then pointing to the correct object, and finally by receiving reinforcers for the correct response. A second group received the same training, but for this group the trainer did not name the object to be selected. The only basis for discrimination was the food or no food consequence. The third group received no training at all. After a standard criterion was reached by each trained group, all subjects were then post-tested. Results showed that the children who received training did substantially better on a post-test than did the no-training group, but the difference between the trained groups was not substantial. Nevertheless, data indicated that neither training condition was successful in establishing stimulus control over a sizable number of subjects. From these data, the authors concluded that it is possible that reinforcing consequences may not be sufficient for establishing the labels as discriminative stimuli for choice. They suggested an alternative strategy which teaches the child to discriminate motor movements in the presence of the object and then to transfer stimulus control over the motor movement to the spoken word. However, a recent paper by Sailor and Saunders (1976) argues that establishing a discrimination between word labels may be a function, in part, of the particular object saliency for the child and the similarity of the stimulus properties of the object to the reinforcer. They offered a stimulus correlation hypothesis which stated that a relative probability of response increase or decrease is

partially a function of the degree of correlation between physical properties of stimuli discriminative for the response, and stimuli comprising the reinforcer. This hypothesis has received some empirical support in a subsequent study conducted by Saunders, Sailor, and Taylor (1976).

Pilot Test and Research Program

In this study, three retarded children were taught a receptive discrimination among pairs of toys to which nonsense labels had been assigned. All three had previously displayed the ability to "point" upon instruction. The subjects were pretested for baselines of time spent playing with various toys, toy selection in a choice situation, and duration of play following exposure to a group of toys. The baseline for the child-selected toy playing was substantially higher in rate than the baseline for pointing to the nonsense-labeled toy in a two choice paradigm (it was initially, chance). Experimental conditions allowed maximum association between the discriminative stimulus and the reinforcing stimulus in one condition, and minimum association in another. In one condition, for example, a subject was asked to point to "FAM" (high-probability-of-response-toy #1) and, if correct, got 15 seconds of play with FAM. Incorrect responses got a 15 second timeout followed by a new choice. Correct responses to "BIM" (high-probability-of-response-toy #2) got 15 seconds of contingent BIM responding. The response (correct point) strength measure was the slope of the acquisition curve depicting a percentage of correct responses on a random schedule of presentations, within a fixed number of trials per session. In Condition II, the same subject got high-probability-of-response-toy #3 contingent upon correct choices to either toy labeled as BIM or FAM. The third toy was held out of sight on the experimenter's lap, under a table, and given to the subject for an equal duration of play as per the contingency. The most-preferred toy for each of the subjects was utilized as the uncorrelated stimulus (#3). The

two stimulus choice toys were close in measured preference, but second and third. The order of conditions was controlled across subjects, and conditions were switched twice for each subject. A fifth "control" condition awarded two other high-probability-of-response-toys (#4, #5) contingent on correct responses, but randomly presented (e.g., 50% correlated, 50% uncorrelated) to control the effect of two versus one reinforcer(s). The results were statistically significant for each of the three subjects in favor of the stimulus correlation hypothesis. (Data were treated by nonparametic statistical tests /chi square; Fisher's Test/ because the graphed outcome was not readily obvious.)

Accordingly, establishing labels as discriminative stimuli for choice may be partially influenced by the degree of similarity between the reinforcing consequence and the objects to be discriminated. The earlier speculation of Bricker and Bricker (1971) that reinforcing consequences may not be sufficient for establishing labels as discriminative stimuli should be reassessed in light of the stimulus correlation hypothesis offered by Sailor and Saunders as well as their preliminary results testing this hypothesis.

Nevertheless, the following study by Diane Bricker (1972) also indicates that, as Bricker and Bricker (1971) suggested, motor responses may indeed serve to mediate word object association with low functioning children.

The training aspects of this study were designed to improve the receptive labeling skills of 11 mentally retarded children. Initially, an experimental group and a matched control group were pretested in order to assess each child's ability to discriminate objects by selecting the one labeled by the experimenter. The experimental group then participated in a three phase training program while no training was given to the control group. In Phase I training, each subject was taught to imitate specific motor movements of the experimenter. The experimenter modeled a motor-movement and successively shaped closer and closer

approximations by providing food reinforcement following the child's response. In Phase II, the experimenter continued to provide the motor-movement model, but in addition provided a label for the action (i.e., "Do rake"). The subject was still required to imitate the motor-movement in order to be reinforced. Finally, Phase III, the experimenter showed the child a three-dimensional object, demonstrated the motor-movement, and labeled the action associated with the object (i.e., "Do rake"). A correct motor imitation by the child was reinforced with food. Periodically, throughout training, both the experimental and the control groups were probed for receptive labeling skills, and when training ended, both groups were post-tested. Comparisons between the pretest and post-test scores for both groups indicated reliable differences in favor of subjects who were trained. The author suggested that these results demonstrated that the training procedure facilitated the development of word-object discriminations for the experimental group.

Finally, Bricker, Vincent-Smith, and Bricker (1973) used a two-choice discrimination procedure to compare receptive vocabulary skills among developmentally delayed and nondelayed toddlers. Twenty subjects participated in the study. Ten of the children (the delayed group) had measured developmental quotients below 75. The remaining ten (non-delayed) children had developmental quotients above 100. The 20 children were further divided into delayed and non-delayed younger and older groups. The receptive vocabulary assessment consisted of 60 two-choice discrimination trials administered in three 20-trial sessions. Each of 20 common objects was presented three times as the named and reinforced item. Trials were arranged so that each item also appeared three times as the unnamed and unreinforced distractor. Results indicated that the young non-delayed and all of the delayed children were under the control of name-irrelevant dimensions of the task, while the older non-delayed children were under control of the object

labels. Selection strategies were analyzed according to object preference, object avoidance, and position preference for both delayed and young non-delayed groups. Fifty-eight percent of the erroneous response patterns were identified, while identification of factors controlling choice in 42 percent of the children's responses was not possible. The authors suggested that identifying response strategies for irrelevant stimulus cues might form the basis for a training program to shift stimulus control from irrelevant to relevant stimuli.

The issue of stimulus properties as influential factors in conceptual development was further studied in the following two investigations concerned with prepositional usage.

Sailor and Taman (1972) used operant conditioning techniques to teach three autistic children (ages seven, five and five) to use expressively the prepositions "in" and "on." Initially, two of the children were trained with the same stimulus objects for both prepositions. For example, a hat was used to teach both "in hat" and "on hat" with the same item. Then, training was switched so that the training stimuli included separate objects for "on" and "in" (e.g., "in pail" and "on chair"). Results indicated that two of the subjects responded more accurately when the objects of the prepositions were different. A third subject began training with the two stimulus objects and was next switched to the one-object condition. His performance in the two conditions was virtually equivalent. The authors suggested that initial training on separate objects of the preposition might have facilitated this subject's ability to discriminate the preposition when only the single stimulus object was used.

A study by Frisch and Schumaker (1974) successfully taught three mentally retarded children (ages 3, 11 and 7) to follow instructions appropriate to the

use of prepositions. Reinforcement and prompting procedures were used in training. The instructions required the subject to place object "next to," "under" or "on top of" other objects. Probe sessions, consisting of untrained items showed that the subjects were able to generalize instruction-following skills to new objects. The results also identified some procedural problems to be considered in the training of prepositional discrimination. It was found that each prepositional category must first be trained separately before successful discrimination between categories could take place (i.e., it was necessary to train "next to" alone, then "under" alone, before the two could be combined, etc.). Also, with one subject, a discrimination between categories was unsuccessful. Apparently, the subject was attending to extraneous object label cues rather than prepositional labels. The solution was to use the same object label cues while varying the prepositional cues. The authors concluded that in training the generalization of a discrimination, it is important to eliminate any cues that may be used by the child in forming unsound generative rules. The authors also point out their conclusion is contrary to the results of the Sailor and Taman study (1972) which suggested that the use of extraneous cues is helpful in learning prepositional discriminations. Several explanations are offered by the authors for the apparent differences between their results and those of Sailor and Taman. First, the Frisch and Schumaker study taught receptive prepositional skills while Sailor and Taman taught expressive prepositional usage. Secondly, Sailor and Taman used only a few sets of stimulus items in training and did not evaluate generalization to untrained items. Frisch and Schumaker pointed out that the disadvantages of the use of extraneous cues became apparent only when children were asked to respond to untrained items. Another variable not pointed out by Frisch and Schumaker is the fact that their subjects were mentally retarded children, whereas Sailor and Taman studied autistic children.

Acceleration of Word Label Usage

Other studies reviewed thus far have been primarily concerned with the teaching of referents in children who initially do not have them. Several studies, however, are reported which describe procedures to increase the use of labels among children who likely have these skills in their repertoires, but do not use them when communicating in the natural environment.

Hart and Risley have conducted several excellent investigations appropriate to what they describe as "incidental teaching" procedures. Incidental teaching denotes a process where appropriate language skills are learned in naturally occurring adult-child interactions. In an early study (Hart and Risley, 1968) disadvantaged preschool children (mean IQ 79) were taught to use descriptive adjectives in a preschool setting. Observations were first made of the spontaneous use of color, size, and number adjectives. During a small group training condition, children were reinforced by praise and a snack for correctly identifying an object by its color. Although the children learned to correctly identify object colors in the training setting, no change was observed during free play observations. When teachers next withheld materials in the free play setting until the children used the correct adjective-noun combination, spontaneous usage increased. The authors make the important distinction between what is "known" and what is "used" by preschoolers and point out the importance of deliberately structuring the preschool environment so that the children may come into contact with the function of descriptive adjectives.

In a second study (Hart and Risley, 1974), preschool materials were withheld during free play conditions to accelerate the use of nouns, adjective-noun combinations, then by specific color adjective-noun combinations, and finally by both requesting the materials and describing how they were going to use it (compound sentences). The "incidental teaching procedure" was again replicated with compound sentence usage in a more recent investigation (Hart and Risley, 1975).

The consistent results reported by Hart and Risley support their position that normal contingencies in a preschool environment (i.e., access to materials) can be effectively used to increase the use of nouns and descriptive adjectives among environmentally deprived young children. Another study by Lahey (1971) demonstrated that adult modeling alone was sufficient to increase the use of both color and size adjectives in a similar population of children. Adjectival usage increased through the modeling procedure even though no reinforcers were made contingent on the use of these adjectives when describing common objects.

The results from the Risley and Hart studies and the Lahey investigation certainly confirm the position that basic concepts usage can be accelerated in children who come from living environments where speech and language usage probably receives less attention than children from less deprived environments. The point by Hart and Risley (1968) is well taken, however, that an important distinction be made between what is "known" and what is "used" by preschoolers. The "incidental teaching" procedures described and used by Hart and Risley would seem to have wide applicability in accelerating basic concept usage in children which they likely know, but which they do not necessarily use. Two major, and yet unanswered issues remain, however, for further consideration. First, can the incidental teaching procedures described by Hart and Risley be successfully used with other and less capable populations of exceptional children? Secondly, and a much more complex issue, how do we best teach basic concepts in children whose deficiencies in these areas result not from the lack of opportunity to use them, nor from the lack of appropriately applied contingencies, but from the complete absence of these concepts in the child's repertoire of language skills?

Collectively, these studies indicate that skillfully applied behavioral procedures and techniques can successfully teach basic referents to many children. Yet, we know that even the most sophisticated teacher will encounter difficulties

with many low functioning children. Previously cited studies by Bricker and Bricker concerning receptive labeling behavior as well as the studies pertaining to prepositional usage (Frisch and Schumaker, Sailor and Taman) indicate considerable research yet to be done appropriate to the teaching of referents. Among the central issues are the importance of relevant versus irrelevant stimulus cues, the role of mediated motor responses, subject population differences, age differences, etc. Other relevant variables include concept acquisition differences as a function of training in either the receptive or productive modalities and the prominent issue of response generalization to untrained stimuli. (Both of these issues will be more explicitly discussed in a later chapter.) In brief summary, there seems to exist the technology for accelerating basic referent usage in children who already have the referents, but do not necessarily use these skills; but considerably more research is warranted into the development of training procedures and techniques to actually teach these skills in low functioning children.

II. Morphological Development

In the area of linguistics, morphology pertains to the forms and grammatical inflections of words as they undergo modification for tense, number, case, person, etc. The area of morphological grammar has undergone the most rigorous experimental investigation of any area of language development by behavioral researchers. Many of the early studies were conducted partly in reaction to critics who maintained that operant conditioning procedures could not be employed to teach rule-governed language behavior--that such procedures could not account for the fact that children correctly use grammatical rules which have not been trained directly.

In essence, the behavioral studies in morphological grammar have centered around the concept of response class. The utility of the response class concept

lies in its conceptual correspondence to the linguistics' usage of "generative" language (Chomsky, 1957). In both cases, the term has been used to describe a significant fact of response development: that there often emerges from language learners more behavior exemplifying the dimensions of the learners' experiences than those experiences have taught them directly. From the behaviorist's point of view, the utility of the response class, conceived as a primary factor in language development, could best be tested by research in the acquisition of grammar. Morphology, as one component of grammar, provided a fruitful area for systematic and well controlled experiments. There were several reasons for selecting morphological grammar as the area of intense study.

First, as the unit of analysis, morphology presented a component of grammar in which imitative stimulus control of speech could be shifted relatively easy to control by object presentations. Yet, English morphology represented an area in which the concepts of response class and generative grammar were operative, and thus, could be experimentally manipulated.

Second, the results from these studies were of direct and immense importance to several theoretical controversies which centered on language development. The experimental tactics employed helped to fill the void left by traditional methodological approaches, and thus provided an answer to Carroll (1961) who earlier had reviewed the research in language development and concluded:

> "One of the basic drawbacks in the available research literature is that it is based mainly on observation in naturalistic settings. Theories of language learning cannot ultimately be tested unless an experimental approach is adopted. Oddly enough, one never seems to think of teaching a child to learn language in the early phases, or of investigating the effects of specific practices in such teaching." (Page 335)

Third, research into morphological grammar had an important practical value because the procedures and techniques developed could be used with language impaired children. Not unpredictably, much of this research was conducted

with retarded children whose delayed speech was often reflected in the absence of morphological rules of grammar.

The Plural Morpheme

In one of the earliest studies of this type, Guess, Sailor, Rutherford and Baer (1968) used operant conditioning procedures to establish a generative use of the plural morpheme in the speech of a severely retarded girl. During training trials, reinforcement was presented contingent upon correct imitation of singular or plural verbalizations by the experimenter, in response to objects presented to the subject singly, and in pairs. A generative productive plural usage resulted, the girl correctly labeling new objects in the singular or plural without further direct training relevant to those objects. Following this establishment of singular/plural usage, the contingencies were reversed (reinforcement of plural responses to single objects and vice-versa). This produced a corresponding reversal of response by the child. The original usage was then recovered by returning to the previous contingencies. Several words whose plurals had been learned according to the reversed plural rule, when examined later during reinforcement of normal plural usage, were found to then exemplify the normal rule currently being reinforced, yet without direct training. In addition, it was found that words which in English follow a different rule than the subject's training nevertheless were pluralized according to the rule involved in her training.

A second experiment (Guess, et al., 1968) showed that the subject had more difficulty on those items with terminal vowel endings. In normal speech, pluralization of words ending in voiced consonants (e.g., car) or vowels (e.g., hoe) require the voiced sibilant /-z/ while plural production of words ending in voiceless consonant sounds (e.g., cap) require the voiceless sibilant ending /-s/. An analysis of the subject's response to the items suggested that in

training she had learned to articulate only the voiceless allomorph in the production of plural words. This finding raised the question of the relationship of phonological acquisition to the acquisition of correct morphological usage. Cofer (1963) suggested that those words requiring the /-s/ phoneme encourage the expression of this sound because the final position of the speech mechanism in producing the word permits continuity of the air flow in the plural formation.

Subsequently, a study by Sailor (1971) sought to determine the extent to which differential reinforcement from an echoic model could control the acquisition of plural allomorphs. In this study, operant conditioning procedures were used to teach two mentally retarded children (ages 8 and 15) to identify pairs of objects by supplying the correct label plus the required /-s/ or /-z/ allomorph. The /-s/ allomorph was required to form the plurals for nouns with unvoiced endings (e.g., cups); the /-z/ allomorph was required to form the plurals for nouns with a voiced ending (e.g., tree). One subject was first trained to supply the /-s/ allomorph and probed on object-pairs requiring the /-z/ ending. Next, the subject was trained to produce the /-z/ allomorph when shown object-pairs while being probed on the /-s/ ending. The training-probe sequence was reversed for the second subject. Results showed that both subjects learned to produce plurals using each of the allomorph forms trained. Probe responses, however, reflected whatever allomorph form was being trained and not whether the probe word-to-be-pluralized ended in a voiced or unvoiced form. Sailor concluded that these results lend further support to the hypothesis that rules of grammar may be acquired through differential reinforcement and, in the specific example of this study, differential reinforcement was more influential in phonological production than presumed physiological determinants as suggested by Cofer (1963).

Two other studies (Guess, 1969; Guess and Baer, 1973) pertaining to the acquisition of plural ending serve to support the role of imitation and differential reinforcement as procedurally effective in establishing rule-governed plural usage in previously aplural retarded children.

Adjectival Inflections and Verb Tenses

Several other experimental studies in morphology concentrated upon different grammatical forms. In one study (Baer and Guess, 1971) three mentally retarded children (ages 7, 12, and 13) were taught to receptively identify comparative and superlative adjectives through the use of differential reinforcement. Specifically, each subject was taught to use the /-er/ suffix to identify one of a pair of objects and /-est/ to identify one object when displayed among the other objects. For example, a subject was shown two balls, and was required to point to the bigger or smaller ball. When superlatives were being trained, the subject was required to point to the biggest, or smallest ball. Systematically throughout the training phases, each subject was asked to point to objects designating the comparative relationship, and to objects designating the superlative relationship. Responses to these probes were never differentially reinforced. Experimental control and evaluation of the effectiveness of training was demonstrated by comparing performances in probe trials across a multiple baseline design. Results showed all three subjects learned to identify the comparative and superlative relationships during training. In addition, this learning generalized to combinations which had not been directly trained.

In another study by Baer and Guess (1973), four mentally retarded subjects (ages 16, 16, 13 and 11) were taught to expand verb actions into nouns by applying the /-er/ suffix. Each child was shown a picture of an action while the experimenter provided the label (e.g., "This man bakes"). The child was then required

to complete the final word of a stimulus phrase which involved the correct suffix ending. For example, the experimenter would say, "He is a _____?"; the child would be expected to provide the correct word ("baker"). Modeling and differential reinforcement were responsible for acquisition of the /-er/ suffix, the subjects were later reinforced for applying the inappropriate /-est/ suffix to verbs normally requiring the /-er/ suffix (e.g., swimmist instead of swimmer). Once criterion performance was reached in this training phase, appropriate use of the /-er/ suffix was reinstated. Results clearly demonstrated that differential reinforcement and modeling was successful in developing appropriate use of the /-er/ suffix.

Schumaker and Sherman (1970) similarly used modeling and differential reinforcement procedures to teach three mentally retarded subjects (ages 18, 16 and 14) to produce the present and past tense forms of verbs. Three verb inflections were trained: verbs requiring a /-t/ inflection (e.g., baked); those requiring a /-d/ inflection (e.g., played); and verbs requiring an /-ed/ inflection (e.g., painted). Initially, each subject was trained to produce the present and past tense of one verb class; then probe sessions were conducted in which the previously trained verb-class and the yet untrained classes were interspersed. Correct responses to probe items were never reinforced while responses to verbs which had been trained continued to be reinforced if produced correctly. This basic procedure was alternated for all inflectional verb classes across a multiple baseline design. Results showed that all subjects learned to produce the correct present and past tense form as a result of training. In addition, the subjects correctly produced the present and past tense forms of the unreinforced verbs (probes) within the inflectional class just trained.

These studies have served to demonstrate that carefully applied operant procedures can effectively teach rules of morphological grammar to children. Additionally, these studies have more than adequately shown that training on specific exemplars of a morphological class generalizes to other exemplars which were not directly trained, thus providing evidence that retarded children can be taught rule-governed instances of grammatical usage. Furthermore, this phenomenon can be operationally delineated and studied as examples of response class development. Importantly, these investigations serve to directly refute an earlier conclusion by Lovell and Bradbury (1967) that mentally retarded children are deficient in the ability to process linguistic information in the same manner as normal children, such that training with any one item should not transfer to correct performance on a similar but nontrained item. The performance of the subjects in these studies seems to correspond to the findings of Berko (1958) who studied the use of morphological rules among normal preschool children. The only obvious difference is that mentally retarded children do require a structured training sequence in order to learn the rule-governed behavior appropriate to the morphological grammar under consideration.

Not unexpectedly, however, some researchers (Ruder and Smith, 1974) have questioned the extensive training required to teach these rules of morphological grammar and have pointed to the "overgeneralization" of the rules which are often manifested by the subjects (c.f., Guess, et al., 1968; Schumaker and Sherman, 1970). Ruder and Smith point out that while the occurrence of over-generalization demonstrates the power of the operant methodology, it also indicates inefficient training procedures. They refer to the studies in pluralization (Guess, et al., 1968; Guess, 1969; Guess and Baer, 1973; Sailor, 1971) as cases in point. Ruder and Smith argue that the plural allomorphs constitute single linguistic behavior with three different phonologically

conditioned surface manifestations (i.e., /-s/, /-z/, and /-ez/). They maintain that interdependent linguistic behavior should be trained concurrently rather than serially. They refer to a study by Schroeder and Baer (1972) showing the efficacy of concurrent training over serial training in establishing vocal imitation. In actuality, the Schroeder and Baer study showed no significant differences in acquisition between serial and concurrent training conditions. However, somewhat greater generalization to nontrained vocal stimuli was found for the concurrent training condition. These differences aside, however, a direct comparison cannot necessarily be made between the vocal imitation skills trained in the Schroeder and Baer study and the teaching of plural allomorphs. In vocal imitation training, differing response topographies are matched to varying stimulus presentations, with the ultimate goal of obtaining vocal productions which correspond to the vocal stimuli of the model. The important point is that the child produces responses following the presentation of a correct to-be-matched model. Rule-governed morphological grammar, however, requires the child to respond to object stimuli alone, without the presence of a correct to-be-matched model. Moreover, the previously reported study by Frisch and Schumaker (1974) found that in teaching prepositional discriminations, each prepositional category should first be trained separately before successful discrimination between categories will take place. Accordingly, with language delayed children, the extent to which concurrent training is effective within a linguistic class remains an empirical question, or whether indeed concurrent training is more <u>efficient</u> than serial training which has already been demonstrated to be effective.

III. <u>Syntactical Development</u>

Syntactical development has provided one of the most complex areas for language intervention efforts. The sparcity of well-documented studies which

succinctly identify a normal sequence in syntactical development has made it difficult to identify target areas for remediation (c.f., Guess, Sailor, and Baer, 1974). Assuming that the therapists can identify specific syntactically deficiencies in a child or group of children, the therapist is next faced with the task of determining whether the child is capable of producing the linguistic structure, provided appropriate contingencies are arranged, or whether the linguistic structure is simply absent from the child's repertoire. In the latter case, a much more intense and comprehensive training program is needed with the realization that there exist some disagreements pertaining both to the content and structure of these programs. Very little experimentation has emerged appropriate to the assessment of specific training techniques and procedures to either develop, expand, or remediate syntac in linguistically deficient children.

Several studies have used modeling and differential reinforcement procedures to either teach syntactical structures which had been assessed to be absent from the child's repertoire, or to teach an expanded syntactical structure in children who exhibited telegraphic speech patterns.

Declarative Sentences

In a study by Garcia, Guess and Byrnes (1973), three experiments were conducted to demonstrate the acquisition and generalized use of both singular and plural declarative sentences in a ten year old severely retarded girl who, prior to training, was lacking in sentence form responses. In each experiment, an adult(s) served as a model(s), and reinforcers (sweets) were contingent on imitation of the model. During training trials an item(s) was shown first to the adult model(s), then to the subject, accompanied by requests from the experimenter to label the item(s); i.e., "What do you see?" Generalization was assessed by a number of nonreinforced probe trials interspersed among training trials.

During the probe trials, the subject was requested to label the displayed item(s) without any preceding labeling response from the model. Using these training procedures, generalized use of a singular sentence ("That is one ___") resulted in Experiment I, and a replication of the procedures with a plural sentence ("These are two ____") was successfully demonstrated in Experiment II. In Experiment III, two models (one adult modeling the singular sentence form and a second adult modeling the plural sentence form) were made available to the subject, but imitations of only one model were reinforced during any one condition. Results indicated the subject labeled probe (generalization) items with the same sentence form that was modeled and reinforced during training trials. The cumulative results of this study demonstrated the development of simple syntactical usage in a severely retarded girl using modeling and reinforcement procedures. Equally important is the finding that generalization to sentence forms correspond with training of similar instances of those response forms; thus supporting previous studies in generative grammar which used various morphological forms as the units of analysis (c.f., Guess, et al., 1968; Baer and Guess, 1971; Schumaker and Sherman, 1970). Similar findings are reported in the following two studies by Lutzker and Sherman (1974) and Sherman (1975).

Subject-Verb Agreement

Lutzker and Sherman (1974) used imitation and reinforcement procedures to teach correct sentence usage to three moderately retarded subjects (ages 32, 12, and 6) and two young normal subjects (both two years old). Specifically, the subjects were taught to use sentences with correct subject-verb agreement in response to pictures presented. In one sentence form, plural nouns were combined with the correct use of the verb "are" (e.g., "the boys are running"); in a second sentence form, singular nouns were combined with the verb "is"

(e.g., "the boy is running"). Preliminary training sessions were conducted to teach separately the nouns and verbs used in sentence training. Following the preliminary training, the complete sentence forms with the correct subject-verb agreement were taught. Training on one sentence form was begun, using a multiple baseline design. Probes containing untrained pictures representing both singular and plural sentence forms were interspersed frequently during training sessions. Results showed that four of the five subjects generalized to the untrained picture stimuli only after training on that sentence form was undertaken, i.e., subjects responded correctly to plural sentences following training on that sentence form and to singular sentences following training on that sentence form. "Overgeneralization" to the yet untrained sentence form was common. With one retarded subject, combined sentence training with the two sentence forms was necessary since he failed to maintain generative production of a prior trained form when a new form was taught. Additionally, the oldest of the retarded subjects responded correctly to plural sentence forms following training of the singular form, and without specific training in the plural sentence form. The authors suggested that since this 32 year old subject had many years of exposure to language, he may have already had the appropriate "is" and "are" usage in his repertoire which was simply not displayed during extensive screening procedures. In general, however, the performance of the retarded and normal subjects was similar in that both types of subjects produced new sentence forms of a particular type after being trained to use examples of the sentence form. The normal children required fewer training sessions to demonstrate generative sentence usage of the type being trained.

Verb Inflections

Clark and Sherman (1975) used modeling and differential reinforcement procedures to teach retarded and disadvantaged children complete sentences in response to questions involving changes in verb inflections. Subjects included three severely

mentally retarded children (ages 15, 16, and 17) residing in an institutional setting and four economically disadvantaged children (ages 3 and 4) who attended a day care center. All subjects had limited speech characterized by single words and short phrases. None displayed use of past and future tense verb forms when asked about common events. Verbal questions alone were used as training stimuli. Subjects were trained to provide correct verb tense answers to statements which included the stimulus item. For example, the experimenter would say, "He is a baker" and then ask "What did he do yesterday?" The correct response from the subject would be, "Yesterday he baked." In a second sentence form the experimenter would ask, "What will he do tomorrow?" The correct response would be "Tomorrow he will bake." For the third trained sentence form, the experimenter would ask, "What is his job?" The correct response would be, "His job is baking." A pool of 48 stimulus items was used in training. Each sentence form was first trained separately, then in combination with previously trained sentence forms, using a multiple baseline design. Generalization probes using non-trained stimulus items were administered following the training of each sentence form, separately, or in combination with other forms. Results across subjects clearly demonstrated the effectiveness of the training procedures in establishing the three sentence forms. New and correct sentence responses to non-trained questions were observed in the generalization probes. "Overgeneralization" of trained sentence forms to yet-to-be sentence forms was observed. Similar performance was found between the retarded and economically disadvantaged children.

Simple-Compound Sentences

Stevens-Long and Rasmussen (1974) report the successful use of contingent reinforcement and imitative prompts to teach an eight year old autistic boy to use both simple and compound sentences to describe a set of standard pictures. In Phase I, the subject was trained to produce four different simple sentence

forms. Following acquisition of the sentence responses, reinforcers were removed with a resulting decline to a pre-training performance level. A return to Phase I training procedures quickly reinstated the use of simple sentence forms when describing the pictures. In Phase II, two simple sentences were chained together with the conjunction "and" inserted between the sentences. Acquisition of the compound sentence form was achieved while the percent occurrence of simple sentences declined to a zero level. Generalization to untrained picture stimuli was indicated in the final training session. As the authors point out, however, a stronger case for generalization would have been achieved had they administered the generalization test following the training of simple sentence forms (Phase I) to demonstrate the absence of generalized compound sentence usage prior to compound sentence training. Nevertheless, the study does serve to demonstrate that modeling and differential reinforcement procedures are effective in teaching a variety of sentence forms. Additionally, the reversal demonstrated the influence of reinforcers in maintaining sentence productions.

Pivot and Open Class Combinations

Jeffree, Wheldall, and Mittler (1973) used imitation and modeling procedures to teach the use of two-word utterances in two four year old Down's Syndrome children. With one subject, directive play sessions were used as a setting to teach single word labels which served as "open class" words. The subject was next given social reinforcement for first imitating, and later spontaneously combining the open class words with a "pivot" word (in this case, "gone"). A second control subject was taught the same words, but not in a pivot-open class combination. Results showed a significant increase in two-word utterances for the experimental subject. Generalization was noted to word combinations not taught directly, and to the child's classroom setting. The procedure was replicated later, with the control subject.

Telegraphic-Complete Sentences

Wheeler and Sulzer (1970) used modeling and differential reinforcement procedures to teach a more complete sentence form to an eight year old boy variously diagnosed as brain damaged, autistic, and mentally retarded. Prior to training he had never been observed to use a complete sentence. Typically, his verbal utterances consisted of single word labels, simple commands, and fragmentary answers to questions. The complete sentence trained included a subject phrase (e.g., "the man"), verb phrase (e.g., "is smoking") and an object phrase (e.g., "the pipe"). Training stimuli consisted of 13 picture cards. When presenting the pictures the experimenter asked, "What do you see?" In order to show that the experimental procedures were responsible for the child's improved performance, the child was temporarily prompted and reinforced for leaving out all articles ("the") and auxiliary verbs ("is"), thus reinstating the telegraphic speech form (e.g., "man smoking pipe"). Throughout all training conditions, "probe" cards were presented to the subject but responses to those cards were never reinforced. Additionally, six non-trained cards were presented during baseline and following training without any prompting or reinforcement. Results showed that the experimental training procedures were successful in producing a complete sentence form, the form could be reversed to the original baseline level, and the responses in both training and reversal conditions generalized to "probe" cards. Additionally, the complete sentence form generalized to non-trained test cards during the final training condition. The authors pointed out that training involved no new vocabulary for the subject, only the manner in which words in his repertoire were combined. Thus, syntactical usage was trained, and the syntax form generalized to non-trained picture stimuli.

A similar study was described by Bennett and Ling (1972) in which imitation and differential reinforcement procedures were used to teach a present progressive sentence form in a three year old hearing impaired girl. Her speech was described as telegraphic, consisting primarily of nouns and verbs, with the absence of articles and auxiliary verbs. Specifically, the subject was trained to use the article "the" and the auxiliary verb "is" when describing pictures. Two pictures were used as training stimuli and 15 pictures were used as probe items to assess generalization. The article "the" was trained initially (e.g., "the girl swimming"); the auxiliary verb "is" was taught next (e.g., "the girl is swimming"). A reversal procedure was used to demonstrate experimental control wherein the original telegraphic sentence form was reinstated. Results showed the training procedures were effective in establishing the complete sentence when describing the training pictures, and the response generalized successfully to the untrained (probe) picture stimuli. The authors concluded that the procedures used might allow hearing-impaired children to acquire a wider variety of syntactic structures at an earlier age than programs based entirely on traditional procedures.

A study by Lovitt and Smith (1972) would indicate that for some children, oral instructions alone can effectively produce both sentence content and length. Their study was conducted to determine the effects of oral instructions on a nine year old mildly retarded boy's ability to describe pictures. In Phase I of the study, the subject was merely asked to make a sentence about each of several picture cards shown to him. These data showed that, in most cases, the boy started each sentence with "This is..." In Phase II, the subject was asked to again describe pictures, but to start his sentences in different ways. In a third condition (Phase III) the boy was asked to make longer sentences. In the final Phase IV, no instructions were given other than to describe the

pictures. Results showed that the oral instructions alone were sufficient to produce a significantly greater ratio of different sentence beginnings in Phase II, and significantly longer sentences in Phase III. These results were also maintained in the no-instruction condition of Phase IV. Additionally, the accuracy of syntactically correct sentence production remained high across all conditions. Finally, pre-to post-test measures with non-trained pictures showed significant changes in the targeted areas of varying sentence beginnings and sentence length. The authors point out that during the course of the study, no formal training procedures, instructional materials, or reinforcers were required. Oral instructions, alone, were sufficient to increase the usage of verbal skills which, however, were obviously in the child's language repertoire. They concluded that, for many children, the classroom teacher can enhance the performance of children by merely specifying for that child, areas where performance needs to be improved.

Other studies have similarly demonstrated improved aspects of syntax using techniques other than differential reinforcement. In one study (Odom, Longhurst, and Boatman, 1973), daily practice sessions with a language master were conducted with six 11-15 year old educably retarded students. Sessions of 45 minutes each were held over a 24 week period. Results showed statistically significant increases in the number and type of noun usage, increased sophistication in morphological and syntactical structures in sentences, and on overall academic performance increase as measured by the Metropolitan Achievement Test.

Odom, Liebert, and Fernandez (1969) demonstrated that tape recordings were effective in producing sentences containing the modeled form (prepositional phrases) for educably retarded adolescents. Vicarious social praise (i.e., hearing the model being praised) had no significant effect on sentence production.

The particular role of reinforcing consequences for syntactical development (as well as most other types of language usage) remains an area for further research. It is well-documented that reinforcement is significantly related to syntactical acquisition in some cases. The question is under what conditions it is not necessary, or under what conditions are the responses themselves "inherently" reinforcing.

With the exception of the Lovitt and Smith study, the other investigations all used various modeling procedures as part of training. One can probably conclude that modeling of the correct syntactical response is important in the acquisition of the particular response form, especially when the response is not already in the child's repertoire of language skills. The important research question concerns the use of modeling alone, or modeling in combination with differential reinforcement for correct responding. None of the studies reviewed has adequately addressed this problem in syntax development.

Finally, as a general and important criticism of all the investigations reveiwed, none was concerned with directly analyzing the effect of training on the child's use of syntax in the normal environment and under normal conversational usage. This, in effect, is probably the most critical test of training effectiveness. In fact, most of the studies reviewed taught syntax in relation to describing pictures. Certainly, other modes of stimulus presentation need to be explored in addition to the central problem of assessing training outcome in spontaneous speech.

IV. Conversational Speech

There have been very few experimental studies to teach conversational speech to handicapped children. This is not especially surprising since conversational speech is often assumed to be a direct result of comprehensive speech and language training programs. It is unfortunate, however, that

conversational speech has not been more intensely investigated as an area of importance to handicapped children. Earlier research has indicated that the language proficiency of retarded children differentially affects both the content (Spradlin and Rosenberg, 1959) and type-token ratio (Siegel, 1963) of adults interacting with them. It is not unreasonable to assume that the verbal proficiency of a child as indicated through appropriate conversational speech has rather important implications for many other social and ecological factors which directly affect the level of behavioral adaptation by the child. Indeed, the ultimate test for any systematic language intervention effort might best be measured by the extent to which the children converse appropriately with those significant and decision-making persons around them.

The intervention programs reported can roughly be divided into two categories--those studies which have applied contingencies to increase the rate of verbal behavior in groups or individual children; and investigations to develop conversational speech (however modest), and to evaluate the training procedures employed.

Speech Frequency

Studies by Barton (1972) and Beissel (1972) serve to illustrate the class of studies wherein specific contingencies are used to accelerate verbal behavior among children and adults who exhibit little social speech. In the Barton study, four severely retarded female women in an institutional setting were reinforced for "social speech" during 15 minute periods. A reversal design was used to compare the following conditions: candy reinforcement, token reinforcement, extinction, and the use of a cue light which was activated at the same time as the dispensing of both candy and tokens, in order to obtain secondary reinforcing properties. Results showed both candy and token reinforcement conditions produced increased verbal responses when compared to baseline conditions.

Tokens (exchangeable for a variety of sweets and personal items) produced a significantly greater number of verbalizations than did candy. The cue light failed to assume secondary reinforcing properties since, after being paired with both candy and tokens, it failed to maintain social speech responses when used alone.

Beissel (1972) describes a study in which teacher attention in the form of praise, smiling, and physical contact was used to accelerate the frequency of verbalizations in a five year old girl attending a Head Start program. The girl had been described as a "non-talker" by her teacher. Results indicated a substantial increase in verbal responses as a function of contingent teacher attention. Experimental contact was demonstrated by a lower percent of verbal responses during a non-contingent teacher attention condition in a reversal design.

While both of the above studies demonstrate that reinforcing contingencies can be used to increase social speech, neither addressed itself to a detailed analysis of the content the verbalization produced.

Conversational Units

Garcia (1974) conducted a study in which three responses were trained separately, and then together, to form a rudimentary conversational unit in two severely retarded children (ages 12 and 18) who were imitative and also exhibited a small repertoire of words. Generalization was systematically measured and trained across settings and different adults. In training, differential reinforcement and imitation procedures were used to teach three sequential verbal responses associated with the presentation of pictures and questions related to those pictures. The three responses included the question, "What is that?", when shown novel picture stimuli; "It's a (label)" in response to a question asked by the experimenter ("What do you see?"); and "Yes, I do." when the

experimenter asked a second question ("Do you want the [label]?"). Three experimenters measured the use of each sentence in separate settings, and with pictures different from those used in training. Two types of generalization sessions were conducted: (1) General sessions in which ten non-trained pictures were shown to the subject with reinforcers delivered on a non-contingent basis; and (2) Intermixed sessions during which ten non-trained pictures were displayed along with a picture which had already been trained. Correct responses to the trained picture were reinforced on a variable ratio schedule. Results showed that both subjects learned the sentences trained separately, and later in the chained conversational sequence. However, little generalization occurred to any experimenter in the General probe sessions. Generalization of conversational speech was obtained with one experimenter after Intermixed probe sessions were conducted. Generalization to a third experimenter was observed in the General probe sessions after two experimenters conducted Intermixed probe sessions. Thus, acquisition of a trained simple conversational unit was achieved in two severely retarded subjects, and through systematic generalization training these responses were observed to occur with novel stimuli in settings other than those used in training.

One of the problems associated with the training of conversational speech in handicapped children is the observation that they might have very little to talk about. This is especially true for those children living in institutional settings which are often deficient in environmental properties and events that would serve as topics for conversational speech. The following study by Keilitz, Tucker and Horner (1973) serves as an excellent example of developing appropriate conversational speech around a common physical property (a television set) found in most environments. Specifically, their study sought to increase mentally retarded adolescents' verbalizations about news events appearing on television. One mildly retarded boy and two moderately retarded boys (all 15 years of age)

served as subjects. The researchers investigated both antecedent and consequent events as variables influencing verbalizations concerning daily news reports. The two antecedent events were Massed and Distrubuted news presentations. Massed news was defined as uninterrupted presentations of an entire news telecast; Distributed news was defined as news presentations that were temporally spaced according to content with interspersed opportunities for verbalizations between news items. The consequences for verbalizations included tokens (exchangeable for money) and verbal praise. Subject responses were scored for accuracy of information to the news item presented. News accuracy was scored according to subject (e.g., "men"), action (e.g., "killed"), object (e.g., "in helicopter crash"), and additional information (e.g., "Harrisburg, Pennsylvania"). A combination reversal and multiple baseline design was used to evaluate antecedent and consequent events on the accurate reporting of news. Results showed the accuracy of verbal statements about the news was higher in the Distributed news format, when compared to Massed news and baseline conditions. Additionally, news reporting accuracy was higher under reinforcement procedures. The authors emphasized the importance of television as an instructional aid with retarded individuals.

A study by Wildgen (1974) included an initial systematic teaching program which was subsequently extended to a spontaneous speech situation. Her investigation included three severely/profoundly retarded children ranging in age from 11 to 14 years. In the first part of the study, subjects were trained by the use of modeling and differential reinforcement procedures to tell stories appropriate to picture cards. Eleven sets of cards--three cards in each set--represented past, present and future events around a common theme (e.g., going to church). Subjects were taught to tell a story for each card. Each story (one each for past, present and future tense) included three sentences. Throughout training conditions, probes were given in which the subjects were asked to

tell stories to non-trained picture sequences representing the three tenses. Training was conducted in a multiple baseline design. Subjects were trained to tell stories in the present tense until criterion performance was reached, they were then trained in the past tense, both tenses were trained together, the future tense was trained, and finally all three tenses were taught simultaneously. The generalization probes were conducted following training in each condition. Results showed generalization to each tense appropriate to the training that had occurred. Overgeneralization was common in that subjects used incorrectly previously trained tenses when describing pictures of yet-to-be-trained tenses.

In the second part of the study, two of the subjects participated in conversational speech training. Sessions were held in a lounge area where the experimenter conversed with the subjects about their past experiences, current activities and future plans. Initially, a pretest was conducted in which the experimenter asked the child about events phrased in the past, present or future tense. Training then proceeded with each tense taught separately, then combined as in the first part of the study which used picture sequences. The pretest questions were interspersed among the conversational training conditions. Results from the two subjects paralleled those found in the first experiment, except training to criterion was accomplished in considerably less time. The author also reported data from language evaluations indicating overall language gains for the children as a result of the training programs.

Remediation of Inappropriate Speech and Elective Mutism

From an operant analysis, two salient dimensions can be applied to any human behavior: response rate and response topography. Rate, of course, pertains to the frequency in which a defined behavior occurs across a specified time dimension. Accordingly, one could argue that children who do not exhibit a particular

speech skill appropriate to their age levels exhibit inappropriate speech patterns in much the same way as electively mute children. The basic difference is that language delayed children simply do not have a speech repertoire to use, whereas the electively mute children simply choose not to use the responses within their repertoire, or do so only under conditions and in selected situations.

The second major dimension of inappropriate speech is concerned with response topography, or the particular form of verbal utterances that can be observably identified separate from the response rate. Inappropriate response topography can include the particular semantic content of the utterances as well as various phonological and voicing features which deviate qualitatively from accepted speech standards.

Elective Mutism

Some of the earlier work by Sherman (1965) has clearly demonstrated the effectiveness of reinforcers in re-establishing verbal behavior in mute psychotic adults residing in psychiatric institutions. Most reported clinical studies with electively mute children have followed similar operant based procedures in the treatment of mutism among usually otherwise normal children. Predictably, most of these studies have treated childhood mutism in school settings.

Positive reinforcement procedures were used by Rosenbaum and Kellman (1973) to treat elective mutism in a third-grade girl who did not speak in school. Initially, speech with a therapist was established by reinforcing (with candy) responses to questions. Generalization was achieved by introducing first the girl's teacher, then other classmates to the therapy room. Reading, answering questions, and group games were used to elicit verbal responses which were reinforced with social praise by the teacher. The group activities were subsequently transferred to the classroom and appropriate verbal behavior in this setting was successfully established. A two and one-half month follow-up showed that

positive results were maintained with the girl fully participating in all classroom activities.

Norman and Browman (1970) reported the successful treatment of a 12 year old electively mute boy using positive reinforcement procedures. Visual feedback from the volume-level meter of a tape recorder was used to help elicit sounds in the initial training sessions, and to also assist in raising speech volume. Tokens were used at various stages of the program to reinforce appropriate verbal behavior. Fading procedures were also used to achieve generalization to new persons and settings.

Calhoun and Koenig (1973) reported a study in which four elementary school children diagnosed as elective mutism were reinforced by the classroom teacher for appropriate verbal behavior. Four other children, similarly diagnosed, received no treatment. Results showed significant increases in spontaneous speech for the children treated, with no substantial changes in the nontreatment group. A one year follow-up showed the treatment effects were maintained for the experimental group, while the four children in the control group were observed to still be functionally mute.

Reid, Hawkins, Keutzer, McNeal, Phelps, Reid, and Mees (1967) described a one day treatment program for a mute five year old girl. Positive reinforcement for appropriate speech and the fading in of other adults were used successfully in the program. Seven therapists, two children, and the child's own mother all worked in sequential and group combinations during the treatment day.

Nolan and Pence (1970) reported a case study on the treatment of a ten year old selectively mute girl. A number of natural positive contingencies were used to increase a relatively normal speech pattern to different persons across a variety of settings.

The above case reports and studies strongly suggest that appropriately applied positive consequences can be successfully used in the treatment of childhood mutism. Variations in procedures occur primarily in the type of reinforcing events used and necessary steps taken to systematically program for generalization to different persons and settings. In some instances (e.g., Rosenbaum and Kellman, 1973; Norman and Browman, 1970) mutism was first treated in a therapy setting and faded into the more natual environment. In other studies (e.g., Calhoun and Koenig, 1973) treatment was conducted directly in the natural setting where the mutism occurred.

None of the intervention studies reviewed adequately addresses itself to the problem of etiology. Friedman and Karagan (1973) have accepted the hypothesis that mutism in children is a learned behavior in response to fear and anxiety. In treatment they recommend the establishment of a relationship between teacher and child wherein speech can be encouraged in a non-threatening atmosphere. They recommend avoiding any coercive practices to force speech, including the withholding of treats or rewards for verbal behavior which they perceive as "bribery." Results from the studies reviewed however, would strongly indicate that appropriately applied positive reinforcers are indeed effective in the treatment of mutism, suggesting that, etiologically, the consequences for not talking may override the reinforcers for talking. More scientifically documented case descriptions of mute children coupled with the systematic manipulation of treatment variables may lead to a more precise understanding of the etiology of mutism with desirable implications for early detection and prevention.

Echolalia

Echolalia in children serves as a prime example of inappropriate speech content where the obvious semantic intent of the utterance is absent. Echolalia is, of course, commonly observed in children variously labeled as autistic,

schizophrenic, brain damaged, and mentally retarded. It frequently accompanies other quite observable inappropriate behavior patterns. Operant based intervention programs for the treatment of echolalic speech are derived heavily from the research and clinical efforts of Ivan Lovaas and similar work of Todd Risley and Montrose Wolf.

Lovaas (1966) described specific procedures for treating echolalic speech in disturbed children. Essentially, the treatment for echolalia involved the removal of positive reinforcers maintaining the behavior or the presentation of a punisher following the echolalic speech. To extinguish echolalic speech, training started by asking the child to label common objects in response to "What is this?" Repetitions of the question were ignored and prompts were used to elicit the correct labeling response appropriate to the item presented. Once the child was responding accurately, the prompts were faded. Similar procedures were used to teach the child to give his/her name in response to the question, "What is your name?" Echolalic repetitions of the question were extinguished, prompts were prdvided for correct responses, and the prompts were eventually faded out. Occasionally, a loud "no" and/or a slap on the hand were used with children whose echolalic speech was difficult to diminish by the withdrawal of positive reinforcers. When echolalia had been reduced and a labeling vocabulary acquired, training was shifted to more abstract concepts such as pronouns and prepositions.

Quite similar procedures have also been described in an article by Risley and Wolf (1967) pertaining to the treatment of echolalic speech. Basically, this article presented specific techniques for bringing echoic responses under imitative control, and then shifting the control of these responses to appropriate environmental stimuli. Specific prompting and fading procedures are outlined, with case examples given for several autistic children. Risley and

Wolf also discussed generalized speech, data collection systems, and the importance of data analysis in the treatment of echolalic speech in autistic children.

Two reported studies have used variations of the Risley and Wolf procedures in successfully modifying echolalic speech patterns in children. Johnston (1966) reported on the treatment of echolalic speech in a seven year old boy diagnosed as both retarded and emotionally disturbed. The intervention program included individualized instruction in a one-to-one therapy setting, extension of the therapy to a classroom situation, and parent training for maintenance of the verbal responses in the child's home. Results showed a substantial increase in appropriate (nonechoic) speech of increasing syntactic and semantic complexity.

Tramontana and Shivers (1971) successfully used a variation of the Risley and Wolf procedures to increase appropriate spontaneous speech in a six year old mentally retarded boy with echolalic speech. A study by Ausman and Gaddy (1974) indicated that reinforcers were effective in increasing appropriate verbal behavior in a 17 year old severely retarded girl described as echolalic.

Garber and David (1974) described training procedures to teach "yes/no" responses to two mildly retarded echolalic children. A combination of differential reinforcement, time-out, and modeling procedures were used in therapy. One subject was presented with yes/no questions dealing with confirmation and denial (e.g., "Is this a ball?"); a second subject was presented with yes/no questions related to acceptance or rejection (e.g., "Do you want a coke?" or "Do you want to wash your face?"). The authors pointed out that the former yes/no response (confirmation or denial) is similar to Skinner's (1957) use of the term "tact," while the latter yes/no response (acceptance or rejection) is appropriate to Skinner's "mand." Results indicated the first subject did not successfully learn the yes/no usage with reference to the confirmation or denial

questions, and this subject continued to emit a high percentage of echolalic responses to the questions asked. The second subject, however, did learn to respond with yes/no responses to the acceptance/rejection questions with a corresponding decrease in the percentage of echoic responses. The author suggested that the semantic as well as structured components of verbal utterances should be considered in language therapy.

Because only two subjects were used, it is impossible to draw any firm conclusion from the findings of Garber and David. However, it is noteworthy that success with the one subject was achieved on the training task requiring yes/no usage in response to a mand. Earlier, Matheny (1968) observed echoic and non-echoic verbal responses in a five year old echolalic boy as a function of antecedent verbal responses from his classroom teacher. The teacher's verbal responses were classified as either mands or tacts in accordance with Skinner's (1957) definition of the terms. Echoic responses were significantly more frequent following tact responses by the teacher, while substantially fewer echoic responses by the child were recorded following mands given by the same teacher. The author concluded that these results supported previous observations that pathological echolalia is influenced by environmental conditions and that echoic responses can best be studied within the context of specific functional relations existing between the verbal repertoire of the child and the verbal behavior of the environment.

In summary, research has demonstrated that echolalic speech can be significantly reduced by operant procedures which systematically shift the stimulus control of verbal behavior to appropriate environmental stimuli. Specific program steps for accomplishing this shift have been described by Lovaas (1966) and Risley and Wolf (1967) and experimentally verified by these researchers as well as others using similar procedures. Garber and David (1974) have concluded

that since echolalia appears to be incompatible with comprehension of antecedent verbal stimuli, their study would suggest that therapy should concentrate on teaching progressively more complex semantic skills rather than merely focusing on eliminating the echolalic behavior. This suggestion is somewhat redundant, however, since most programs for treating echolalia necessarily include procedures for teaching functional responses which compete with echolalic speech patterns. Matheny's (1968) earlier suggestion that echolalia can best be studied within the context of functional interaction between echoic speaking children and those persons in their environment is deserving of more attention from researchers. An emerging interest in the ecological variables effecting language acquisition is equally germane to inappropriate language development. More research similar to Matheny's study might help to identify antecedent events which, if manipulated, could serve to reduce echoic speech, in conjunction with the simultaneous manipulation of those events which function as consequences for the same behavior.

Inappropriate Speech

Barton (1970) reported an experimental study to modify inappropriate speech in an eleven year old severely retarded boy residing in an institutional setting. The subject had a relatively large vocabulary and spoke in well articulated sentences. His responses to simple questions, however, were often bizarre and inappropriate to these questions. His answers often took the form of jingles and advertising slogans which were contextually unrelated to the questions asked of him. Training sessions consisted of showing the subject 50 pictures from a variety of current magazines. The experimenter would point to a picture and ask one of two questions: "Who, what, where is (that doing_____)?" or "What, where (is, are) (he, she, it, they) (doing, having, playing, etc.) (here, there, on, in, the_____)?" Appropriate responses were reinforced with candy, no-responses were ignored, and inappropriate responses resulted in a brief time-out

in which the Experimenter closed the magazine and turned her head for ten seconds. Experimental control was demonstrated by a reversal condition in which inappropriate responses were reinforced for a brief number of sessions, followed by a return to the original response contingencies. A generalization test was administered prior to training and following each of the two conditions in which appropriate responses were reinforced. The generalization test consisted of 33 questions from magazine pictures (never used in training) and 66 general conversation questions. Results strongly demonstrated the effectiveness of the reinforcers in producing appropriate verbal responses during the training conditions. However, response generalization to the untrained pictures and conversation questions was much less pronounced. The author suggested that the subject's poor performance on the generalization test was possibly due to the absence of reinforcers given in that situation in contrast to a continuous reinforcement schedule used in training.

Sanders (1971) described a "cessation-dependent" timeout procedure to decrease inappropriate conversation in a 16 year old retarded girl residing in an institution. The target response consisted of inappropriate and frequent conversation concerning supplies needed by the institution. The procedure required aide staff to close their eyes and "freeze" when the girl engaged them in the target behavior. The aides would respond appropriately to the girl when she shifted to an acceptable conversation topic. This procedure significantly reduced the frequency and duration of the inappropriate verbal behavior when compared to pre-training levels and another condition (referred to as the cessation independent condition) which merely required the aides to walk away from the girl when the inappropriate speech occurred. The author concluded that the cessation-dependent timeout procedure had greater discrimination stimulus properties than did the cessation-independent timeout procedure since the former condition

left the aide in the subject's presence and thus allowed the opportunity for appropriate conversation to occur. Generalization of the desired results to another inappropriate topic of conversation did not occur.

The following study by Rubin and Stolz (1974) exemplified a treatment program specifically designed to produce the desired generalization effects. These investigators used positive reinforcement to modify inappropriate speech in a 13 year old severely retarded boy. The subject incorrectly used personal pronouns, and his speech was described as perseverative and filled with commands to himself. In this study, the subject's verbal behavior was classified simultaneously along two dimensions. The first category was scored as normal, inappropriate, or idiosyncratic speech; the second category included either correct or incorrect self-referent speech. Combinations of the two categories included incorrect or correct self-referenced (pronouns) in utterances scored as normal, inappropriate, or idiosyncratic speech. Initially, the subject was taught to use the pronouns "I," "my," "you," "your," she," and "her" in response to questions asked by the experimenter. Praise and consumable reinforcers followed responses which included the correct pronoun-noun phrase. Following pronoun-noun phrase training, a second condition was initiated in which training was extended to the classroom using the teacher aide as the therapist. Next, out-of-class pronoun sentence training was conducted and that was also subsequently extended to the classroom. Throughout all conditions, the subject's normal, idiosyncratic, inappropriate, and self-referent spontaneous speech was recorded in the classroom. Results from these spontaneous speech samples indicated the percentage of normal speech increased significantly during the extended classroom training conditions and more self-referents were observed. Idiosyncratic speech varied across conditions, but showed a steady decline. Inappropriate speech fluctuated considerably with no clear changes across conditions. Follow-up

observations indicated the training effects were being maintained by the subject. The authors pointed out that new combinations of pronouns were correctly used with other words not included in training, demonstrating appropriate response generalization. Additionally, the subject's improved speech was maintained outside of the training situation; and while the training procedures were applied only to the use of personal pronouns, generalization was observed in the increase of normal spontaneous speech.

Perseverative Speech

In a study reported by Butz and Hasazi (1973), the perseverative speech of a seven year old mildly retarded boy was reduced through the use of differential positive reinforcement. The child's language repertoire included the ability to use complete sentences, to ask appropriate questions, and to initiate speech. These appropriate responses, however, were frequently followed by periods of perseverative speech (i.e., repeating the appropriate response). Daily 20-minute training sessions were conducted in which the experimenter showed the subject a number of pictures. Each presentation was accompanied by a request for the child to identify who or what was being shown. Any response which was unrelated to the experimenter's question, was repetitive, or was unintelligible was considered "perseverative." For each speech episode that did not contain perseverative speech, the subject was reinforced with a penny and praise. Results showed a substantial decrease in perseverative speech during the 20-minute training periods.

"Cluttered" Speech

Simkins, Kingery, and Bradley (1970) reported a study to reduce "cluttered" speech in a nine year old girl diagnosed as childhood schizophrenia. Cluttering was defined as a diverse set of speech anomalies such as letter and vowel substitutions, poor articulation, word omissions, and abnormal speech tempo. First,

procedures were used to improve speech intelligibility during oral reading sessions. Baseline data indicated an excessively high word rate per minute without pauses for commas and periods. Stars were made contingent on appropriate pauses when reading. The stars were exchangeable for field trips and other outings. This procedure reduced the oral reading rate but did not reduce the rate of unintelligible speech. In a second treatment condition, the subject was reinforced for well-articulated verbal responses in imitation of the therapist who read from books. Significant improvement in intelligibility was noted. This improvement generalized to test situations in which the subject read by herself orally and was reinforced for appropriate pauses. In a third condition (auditory feedback) the girl was reinforced for reading passages from a book. Tape recordings of the session permitted the therapist to stop the tape when an error was made, and then have the subject imitate a correction of that error. The procedures were next extended to conversational speech. Initially, the subject was required to say nursery rhymes in which the written words were gradually reduced. This was faded into conversation related to partially completed sentences written on cards (the subject completed the sentences). Next, a free speech condition was implemented in which the girl talked about common objects brought to the training sessions. Additionally, the auditory feedback procedure was used when errors were made in the free speech situation. Results in the free speech condition again showed a significant decrease in cluttered speech which, however, did not generalize to other settings and persons.

Increasing Volume

A study reported by Jackson and Wallace (1974) described procedures for increasing the voice intensity of a 15 year old mildly retarded girl diagnosed as severely disturbed and withdrawn. Prior to the study, she had never been observed to engage in spontaneous social interactions during school where she

was enrolled in a class for the emotionally disturbed. During training, the girl was conditioned in a laboratory setting to speak loudly enough to activate a voice operated relay. The subject was required to read words during training. Tokens (exchangeable for a variety of personal items) were delivered contingent on an increasingly higher voice level across training sessions. Experimental control of the reinforcers was evaluated by reversing the contingencies such that in one condition, tokens were delivered for again talking in a soft voice. Generalization was measured in a daily lab check and in the classroom. In the former case, the subject was required to read from a book in the laboratory room following each voice intensity shaping session. Generalization to the classroom was measured during group reading periods with other classmates. Results clearly demonstrated that the token reinforcers were effective in developing a normal voice intensity. Generalization from training to reading aloud in the experimental room also occurred. However, generalization of voice intensity to the classroom reading group occurred only after the teacher dispensed tokens during this period. The authors suggested that the combination of laboratory training and programmed generalization to the natural environment appears to be more effective than either used alone for problems of this severity.

As these selected studies indicate, operant procedures have been used quite effectively in the remedial treatment of numerous and varied inappropriate speech patterns among children. This review has not included the more common articulation and stuttering problems among children in the attempt to limit the scope of this chapter, while concentrating on studies dealing with lesser known areas of speech and language intervention and development.

Collectively, the investigation indicates that systematic remedial training procedures using operant based principles can significantly and demonstrably improve the speech patterns of children who display inappropriate language.

These investigations have shown that the rate of appropriate speech can be increased, and that the topography of speech can be improved for both phonological and semantic features.

Again, the prominent area of needed research is that of generalization of speech and language behavior to non-trained settings and to persons not involved in the training program. Several investigations (cf. Calhoun and Koenig, 1973; Rubin and Stolz, 1974) have emphasized generalization during the training process. Subsequent research and applied training programs for inappropriate speech should concentrate on techniques to both establish and measure generalization from training to a variety of natural settings in the child's language environment. Further research should also be conducted to more carefully analyze the socio-ecological variables which likely function to both reinforce the development of inappropriate speech and maintain the behavior over time. The earlier study by Matheny (1968) with echolalic speech serves as an example of this type of needed research.

Conclusions and Recommendations

The purpose of this chapter has been to present an overview of areas of linguistic training and remedial procedures which have primarily used operant based principles. For the most part, the investigations reviewed have served to exemplify the systematic application of behavioral techniques (primarily imitation, modeling, and differential reinforcement) to numerous areas of linguistic development and remediation. These studies have identified observable speech and language behavior to be modified, followed by the precise measurement and analysis of the intervention effort. In sum, these investigations have impressively demonstrated that linguistic training and remediation can be approached in the same scientific manner as other non-language behaviors. Additionally, the careful application of scientific procedures have served to

enhance the desired treatment outcome in a way which not only benefits the children undergoing treatment, but has also provided documentation which allows replication of the procedures used and, ultimately, a better understanding of language acquisition.

At best, however, one can conclude that the past decade has only produced the beginnings of a technology for the remediation and development of speech and language among handicapped children. There remains a number of unanswered questions which need attention in future research--investigations which must necessarily lead to answers to more basic questions before comprehensive language programs can be developed which meet the many needs of speech handicapped children. (The next chapter is devoted to the current status of existing comprehensive programs; some of which have evolved from the procedures, techniques, and results of studies reviewed in this chapter.) Some of the areas perceived as being important to subsequent research endeavors are summarized below.

Research Recommendations

1. Semantic Development. This is one of the key areas in need of considerably more research. Basically, little is known about the procedures used to teach basic referents to children who are absent in these skills. A critical issue is the need for the development of procedures to teach referents which have appropriate functional usage (meaning) for the child.

1.1. Research in semantic development should be addressed to the issues of relevant versus irrelevant stimulus cues, the role of mediated responses (e.g., motor responses), the contribution of reinforcer specificity in reference labeling, as well as more organismic variables such as subject population differences, age, etc.

1.2. The broader issue of reference acquisition as a function of training in either the productive or receptive modalities needs to be further researched.

The basic question is whether training in either modality facilitates acquisition in the other modality or whether each is functionally independent of the other.

2. Morphological Development. The acquisition of morphological grammar has received considerable attention from researchers. In sum, the technology is now available to teach rules of morphological grammar to handicapped children who, prior to training, do not exhibit the use of various morphological forms.

2.1. Subsequent research should address itself to the problem of measuring the trained morphological rules in the child's normal verbal interaction with the environment, and in developing generalization training procedures to be used when generalization does not occur. Research has sufficiently demonstrated that, if properly programmed in training, children's language behavior can be made to generalize to non-trained exemplars of the trained rule. It has yet to be determined, however, that these rules are used in appropriate conversational speech as a direct result of the intervention effort.

2.2. Additional research should also concentrate on the efficiency between concurrent and serial training procedures in the development of morphological rules within linguistic classes. The basic question is whether "overgeneralization" of the trained rules can be reduced by concurrent training procedures which treat allomorphs as a single linguistic behavior with different phonologically conditioned surface manifestations.

3. Syntactical Development. There have been relatively few studies directed towards the experimental analysis of syntax among handicapped children. Likely, this is in part due to the emergence of more comprehensive language training programs where syntax is taught as one component of a larger intervention effort. There are, however, several issues central to the development of syntax where further research is desired.

3.1. Research to date had indicated the important role of modeling in the acquisition of syntactical rules. More data are needed to evaluate the effects of modeling alone, or modeling in combination with differential reinforcement in response acquisition. This type of research should necessarily take into consideration the existing level of syntactical development in the subject population with the strong possibility that both modeling and differential reinforcement are necessary for children who have yet to acquire syntax beyond a rudimentary level.

3.2. Further research is most needed in directly analyzing the results of syntax training procedures in the non-training environment and under normal conversational conditions.

4. Conversational Speech. Conversational speech, like syntax, is often assumed to be a direct product of comprehensive speech and language training programs. For some children, however, direct and systematic training in conversational and spontaneous speech will likely be required. Essentially, there is little experimental literature available in this area.

4.1. Further research and program development are needed to identify specific procedures for teaching conversational speech to many handicapped children. The major consideration is whether the conversational speech usage is appropriate to the environment where the child resides.

4.2. Research is needed to assess and measure the influence of various socio-ecological variables on the acquisition and maintenance of conversational speech. This would necessarily entail a large research effort to analyze conversational speech, or the absence thereof, in relation to the myriad of physical, psychological, and social events and properties available to the child.

5. Inappropriate Speech and Elective Mutism. Basically, the same research needs in the area of conversational speech can also be applied to inappropriate speech. These research recommendations include:

5.1. An analysis of training effects to non-training settings and persons; and the study of variables which influence the degree of generalization.

5.2. Investigations into the socio-ecological variables influencing both the development and maintenance of inappropriate speech, with primary emphasis on the establishment of speech and language environments which minimize the reinforcing consequences for the use of inappropriate speech. Likely, a careful analysis of socio-ecological factors which accelerate appropriate conversational speech will be found incompatible with the type of environment which encourages inappropriate speech.

CHAPTER 4

THE EVOLUTION OF COMPREHENSIVE SPEECH AND LANGUAGE PROGRAMS

The importance of modeling, imitation, and reinforcement for the development of speech and language has been a lively and somewhat controversial area of applied research. Almost all of today's speech and language intervention programs have been directly influenced by at least two considerably different theoretical positions. One position represented roughly by linguists and psycholinguists presupposes an innate, uniquely human capacity to acquire language (Chomsky, 1959, 1965; Lenneburg, 1967). The other position maintains that humans are no more predisposed to learn language than they are to learn other behaviors, and that it is man's interaction with his environment that accounts for language development. An early spokesman for the latter position has been B. F. Skinner. In fact, Skinner's book Verbal Behavior (1957), and Chomsky's critical review of that book (Chomsky, 1959), has become somewhat of a historical marker representing the starting point for an exceedingly productive and controversial period of speech and language research that is still in progress. Unfortunately perhaps, both theoretical positions took off in completely different directions using different research strategies and data analysis processes.

Skinnerian researchers purposely sought language deficient populations such as mentally retarded children, or adult mute psychotics, and applied learning principles to establish, to reinstate, and to maintain speech and language behavior. This analysis required, "...a believable demonstration of the events that can be responsible for the occurrence or non-occurrence of that behavior" (Baer, Wolf, Risley, 1968, p. 84). Behavior analysts designed

experimental control procedures that showed impressively that a target behavior (whether language or not) could be systematically manipulated by rearranging consequences for the behavior. As indicated in the previous chapter, demonstrations show that modeling, imitation, and reinforcement techniques could be used systematically to reinstate speech in previously mute psychotics, to correct the inappropriate use of speech and language, and to develop rudimentary speech and language for the first time.

Linguists and psycholinguists approached the study of language somewhat differently. They examined how language emerges in normally developing children. Of particular importance to them were the variables responsible for the acquisition of grammar and the sequence by which language emerges. Their data tended to indicate that the comprehension of language precedes expression, that mastery of a class of distinctive sound features must occur before more "speech like" vocal behavior develops, and that nouns and action verbs precede the more grammatical forms such as negation and interrogation. Generally, linguists and psycholinguists have sought to define a potentially correct developmental sequence for language acquisition.

Because their approaches (and in effect their respective purposes) were so divergent, it has been difficult to assess the data accumulated from the different theoretical positions. Only recently, have a few researchers attempted to integrate some aspects of the divergent language theories into one that is considered an interactive approach (Staats, 1974; Lynch and Bricker, 1972).

In this section of the final report, some of the major comprehensive speech and language programs are examined which are currently in use today. The need for such an examination exists because there is a plethora of language intervention curricula being offered today. It is not only difficult for the untrained

teacher, paraprofessional, or parent to distinguish between these various programs, but even highly skilled language theorists must sift carefully through all of the programs in an effort to locate the "right one." Some programs use an operant conditioning framework as a theoretical basis (more or less as reflected in Verbal Behavior, 1957) for training language behavior (Guess, Sailor, Baer, 1975; Hartung and Hartung, 1968; Drash and Leibowitz, 1973; Gray and Ryan, 1973). Other programs are inherently psycholinguistic in structure but use operant conditioning techniques as an effective teaching strategy. Programs that fall into this category make a fundamental distinction between the theoretical model and operant conditioning techniques as part of the overall strategy to train the psycholinguistically based content and sequences. Theorists and practitioners who are responsible for these intervention strategies suggest learning theory does not describe WHAT needs to be taught, but rather provides a technology that best demonstrates HOW to teach. Programs that fall into this category are also experiencing considerable popularity (Miller and Yoder, 1974; Stremel and Waryas, 1974; and MacDonald and Blott, 1974). Finally, there seems to be another category of language intervention programs. Such programs integrate aspects of learning theory, aspects of psycholinguistic theory, with other popular theories of child development. The Piagetian-based program by Bricker, Dennison, and Bricker (1975) is an example.

A closer examination of some of the language programs represented in each of the intervention strategies mentioned should provide the reader with some additional perspective when attempting to compare one program with another. Before beginning the review, however, it will be useful to try to explain the criteria used to select programs for inclusion. First, the use of the descriptive adjective, comprehensive is somewhat misleading. Almost any activity can be judged to be comprehensive if it thoroughly explained its goals and

methods. Programs that were designed to teach a generalized motor or vocal repertoire, or even a rudimentary labeling skill, certainly can be considered a comprehensive training program. In fact, one characteristic of operant research has been specificity. Clearly, Sebastian Striefel's motor development program (Striefel, 1974) is an example of such a program. However, programs of this type were excluded from consideration in this review. If "comprehensive" is interpreted to mean a "total communication system" which assumes the client possesses no functional language skills, then such a program would begin by teaching prerequisite or prelanguage behaviors (see Chapter 2). By using this criterion, the following intervention models would be excluded from consideration: a) Miller and Yoder (1972a, 1972b, 1974), b) Guess, Sailor, and Baer (1975, 1976), c) Stremel and Waryas (1974), and others. One method that was used to select programs for review was to consider the terminal behavior or stated goal of the program. A program was considered for review if the terminal goal was to teach the spontaneous use of speech and language for the purposes of communication. A program's "visibility" was also considered as an implicit criterion. That is, a program was reviewed if it was frequently cited in the professional literature and/or if the program has been utilized in centers for speech and language remediation. An exception to this implicit criterion occurred if the program was particularly innovative and potentially useful, yet for some reason has remained obscure. Programs that were obscure, in unpublished form, and merely copies of already widely used programs were omitted. The terms "program," "intervention strategy," and "curriculum" in this chapter are used synonamously.

Forerunners to Comprehensive Speech and Language Curricula

Since the early 1960's, there have been numerous demonstrations attesting to the effectiveness of operant conditioning techniques to establish and maintain

prelanguage and rudimentary language skills in severely handicapped children. As early as 1964, Wolf, Risley, and Mees conditioned the speech of a four year old autistic boy so that he was no longer producing inappropriate or bizarre speech but rather, speaking in a manner that was more akin to the speech and language skills of a normal four year old child. Modeling, imitation, and reinforcement techniques played a critical role in the remediation process. This study was especially significant because it demonstrated that problem behavior could be modified in the applied setting as well as in the more constrained experimental laboratory. Other impressive demonstrations appeared during the 1960's showing that inappropriate speech could be corrected and that language skills could be developed in previously mute children (Sloane and MacAulay, 1968). These studies, in part, fostered some of the conceptual issues surrounding the role imitation in language development among normal children. Of particular importance was whether imitation alone was responsible for eventual development of syntax.

Brown and Bellugi (1964) suggested that imitation and reduction of the model's utterance; imitation of the child's utterance by a listener and expansion; and "induction of the latent structure" are three processes by which children acquire syntax. According to the first process, a child's imitation of a vocal model usually is a poor one. Some utterances the child hears in the original model are missing in his imitation, yet, the imitation seemed to retain the correct word order and meaning. On a conceptual basis, Brown and Bellugi argued that their results showed that children process the speech model as a total construct rather than as a string of unrelated sounds. For example, a parent might say, "That's a pretty dollie" to which the child might imitate "Pretty dollie." There is a systematic retention and omission of utterances which might be a function of parents placing differential stress on words that have semantic

importance and on words that have little functional importance. In most cases, the stressed words are singular nouns--words that usually appear first in children's verbal repertoires. The fact that these reductions retain meaning, and are in some sense communicative, might contribute to the child's acquisition of syntax. If "understandable," child utterances give the parents an immediate opportunity to provide corrective feedback in the form of a slightly more difficult model. That is, words are included that make the child's utterances more grammatical. This process essentially involves an imitation of the child's utterance by the parent but with something added. Brown and Bellugi believed that this process performs two important functions. First it serves to confirm the child's imitation; second, it takes him a little beyond the first attempt while retaining all of the essential environmental stimuli. Slobin (1968) pointed out that the imitation and expansion process provides the child with an opportunity to engage in slightly more complex vocal behavior at a time when the child is paying attention to the parent and while the semantic content of the utterance remains intact.

Induction of the latent structure was the third process by which children acquire syntax according to Brown and Bellugi. This process involves a phenomenon by which children are able to make utterances that do not conform to adult speech (i.e., "Put a gas in"), and which cannot be considered systematic reductions of adult models. Brown and Bellugi considered them to be more like "mistakes" in children's attempts to induce regularities of speech. Because these utterances occurred, Brown and Bellugi argued that language theorists could not rely only on imitation and expansion (modeling) to account for a child's grammatical competence. The strictly linguistic or psycholinguistic view maintained that in order to support the learning theory account of imitation and modeling, it would be necessary to believe that the sum of all learning would have to

come from the imitation process and "mistakes" appearing in children's repertoires contradict the hypothesis. The frequently heard objection to learning theory's account of language development was..."no language program can possibly teach all of the responses a child will need simply by employing a program of modeling, imitation, and differential reinforcement" (Miller and Yoder, 1974, p. 506). Ervin (1966) in fact, attempted to assess whether the spontaneous imitations of five children were governed by the same grammatical rules as their freely generated sentences. A sample of each child's speech was taken and rules for spontaneous speech were developed. The study's findings indicated that both speech forms were equally predictive from the "provisional grammar" that was written. Ervin concluded that since spontaneous speech was syntactically similar to the imitative speech, overt imitations did not seem to serve as a basis for systematic grammatical development in young children. Ervin also pointed out that the children in her study were 1) able to form new plurals when neither the singular nor plural forms of the word had ever been modeled (i.e., from BIK to BIKS), 2) able to produce past tense inflections as "buyed," "comed," and "doed"--all of which were not likely modeled by an adult, and 3) able to produce a great variety of sentences that could not have been reproduced by chaining strings of words together. Ervin, like Slobin (1968) and Brown and Bellugi (1964), concluded that imitation alone could not possibly account for children's rapid grammatical development.

Concurrently with the data being accumulated by linguists and psycholinguists, operant researchers were conducting studies designed to show that generative (or generalized) language repertoires could be established by relying on modeling, imitation, and reinforcement techniques. Very little was done to isolate the contribution of imitation alone of each technique, however. Guess, Sailor, Rutherford, and Baer (1968) taught a ten year old mentally retarded child

the generative use of plurals in labeling pairs of objects. The child was shown a picture of a single, or of a pair of objects and asked, "What do you see?" Correct labels were reinforced with bits of food. If the child did not respond to the pictures, the trainer modeled the correct answer and reinforced the subject if she imitated the model. Eventually the child learned to apply the correct label to single objects and to pairs as they were randomly presented to her. In addition, the child learned to supply the appropriate labels to objects that were never trained, thus demonstrating that imitation, modeling and reinforcement procedures were effective in developing a modest generative use of the plural morpheme. To assess the role training nad on the child's performance, the experimenters (following the applied behavior analysis strategy) required the child to supply the single label when shown pairs of objects and the plural label when shown a single object. As for the earlier condition, the child was reinforced for giving the expected answer. Initially in the "reversed-use" condition, the child made a few errors but gradually began to use the reversed labels. This demonstration presented a challenge to the arguments posed by those who said that generative language skills could not be established through the use of imitation, modeling and reinforcement. Other studies supported the Guess, et al., (1968) demonstration. Wheeler and Sultzer (1970) taught an eight year old mentally retarded boy to use sentence forms that included articles and verbs to describe a set of pictures. The child was shown a picture and asked, "What do you see?" As soon as the child erred in his reply, the trainer interrupted the response, provided an imitative prompt for the correct form, then allowed the child to continue. Reinforcement always followed the terminal component. The results showed that the child began to produce complete sentences to pictures that had never been trained in addition to the pictures that were trained. Another impressive demonstration of the use of operant conditioning

techniques to condition a generative form of language was done by Schumaker and Sherman (1970). In this study, three mentally retarded children were taught to produce present and past tense verbs in response to verbal requests. The basic training strategy included a statement such as "Now the man is painting. Yesterday he _____." The child was required to finish the statement by using the appropriate verb and past tense inflection. The results of this study showed that children not only produced the correct past and present tense verb forms to the training stimuli, but they also began to produce correct present and past tense to untrained verbs.

Other demonstrations appeared in the literature showing that imitation, modeling and reinforcement could be used to teach a new language skill and that retarded students could generalize what they had learned to unique situations. It has been argued, however, that the form of "generative" language developed in the early operant research might be considered to be relatively simple. Most of the studies used retarded children to demonstrate one specific language skill, and under one very specific set of environmental circumstances. How much language will generalize to different situations where the spontaneous use of language is expected, is one of the unanswered questions.

O. Ivar Lovaas and his colleagues at the child development laboratories at U.C.L.A. designed one of the earliest "comprehensive" intervention strategies to modify the deviant behavior of 20 autistic children. One important component of their program was language training. Because the children possessed no, or very poor attending skills, it was imperative to "teach the children to attend to the therapist so that the building process could begin." Thus, the children began in a program that is now usually referred to as "Attention Training." Each time the child briefly looked at a supervising adult, the therapist reinforced the child with food and praise. Gradually through a shaping process,

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ABSTRACT

Because school administrators, particularly superintendents and their top level management staffs, occupy such critical roles in the nation's schools, guidelines for their training and preparation must be systematically and periodically reexamined. The purpose of this guide, the first in a series of three, is to help those persons involved in the training, employment, evaluation, and promotion of school administrators. Topics discussed include competence and employment guidelines, credentials and the certification process, identification and development of personnel, preparation and training, field experiences, and professional development. (Author/LD)

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Table of Contents

Foreword 1

Preface 2

Beliefs 3

Definitions 4

Guidelines 5

- Competence & Employment 5
- Credentials & Certification 5
- Identification & Development 5
- Preparation & Training 6
- Field Experiences—Internship 9
- Continuing Professional Development 10

Afternote 11

Acknowledgments 11

Foreword

Because school administrators, particularly superintendents and their top level management staffs, occupy such critical roles in the nation's schools, guidelines for their training and preparation must be systematically and periodically re-examined.

AASA's most recent analysis was prepared by the Committee for the Advancement of School Administration (CASA). The Committee's purpose was to sharpen the focus of those involved in the training, employment, evaluation and promotion of school administrators. While not all issues were resolved, a flexible statement of beliefs and suggestions to school boards, university personnel, consultants, and association members and officers was developed.

The guidelines included in this publication do not contain a statement of "how," or a rundown of the means to achieve the ends described. While CASA believes that the "how" and "why" are equally important, the means to attain the recommendations contained in this publication could not adequately be prepared by any single association committee. The scope of this document then, not only includes initial preparation but also continued in-service education for better performance of all school administrators and university personnel.

The Committee for the Advancement of School Administration recognizes the interdependence of the many interests and values of its colleagues throughout the education enterprise.

We hope that this booklet, part of a series of AASA publications on the career development of the superintendent, proves a valuable resource in improving the preparation of school administrators.

The CASA Committee

Preface

As all Americans look to the 1980's, school administrators are faced with an uncertain future clouded by great social change. To respond rationally to the challenge of the future, educational leaders must have a solid foundation of professional knowledge. To prepare educators for new leadership roles the profession must analyze the significance of educational issues and trends. The entire structure of education—from the national level through state organizations to local school systems—must cooperate in a major effort to identify and develop leadership for the tasks that lie ahead. Useful knowledge needs to be compiled, analyzed and transformed into learning activities and strategies that will best meet the evolving leadership needs.

Beliefs

The Committee for the Advancement of School Administration believes that the promotion of interrelationships in the art and science of school administration must now rest squarely upon all members of the profession. These individuals must assume the responsibility to share their best ideas about administrator preparation and development with colleagues. State administrator organizations should actively participate with higher education personnel in planning and supporting research directed at improving the preparation of school executives.

CASA further believes that persons who serve in major educational leadership roles must have a strong desire to work with the youth of our country and:

- Understand that the primary focus of education must be on the youth it serves
- Understand that the purpose of education in a democracy is to develop informed responsible citizens
- Understand the social functions of education in order to diagnose both productive and nonproductive relationships between the schools, the community and the larger society
- Understand educational objectives, methods and processes in order to identify the extent to which schools are or are not achieving desired objectives, and to locate areas within the organization where resources are or are not fully utilized
- Understand the nature of the organization as a means for identifying points of conflict which need to be remedied and points of greatest potential for accomplishing new and better means of operation, and
- Understand human relationships and skillfully utilize the dynamics of group processes so that an effective utilization of human resources within the school community can be achieved.

While the required knowledge base for the preparation of educational leaders is in the process of refinement and expansion, the American Association of School Administrators offers the following guidelines for improving the professional preparation and continuing professional development of school administrators.

Definitions

For purposes of this document the following terms are defined:

Standard of Competence

A level of job related performance that is established as essential for a satisfactory rating/evaluation

Performance Based Training

Preparation that is designed to solve actual problems confronting practitioners in the field and is composed of the skills/sub skills deemed requisite

Training Institutions

Any organized and recognized site and faculty which is involved in preparation of school administrators

Internship

An experience in which administrators (prospective or experienced) work under supervision in actual job related field roles of various types to perfect their skills and develop an understanding of the dynamics of school administration

Guidelines

Competence and Employment Guidelines

School boards should agree to employ for administrative positions only persons who have demonstrated through successful performance in academic course work and related practical experiences that they possess the essential knowledge and leadership skills for those roles.

Credentials and Certification Process

In order to encourage competence in all school administrative assignments, educational authorities should enforce and seek to improve certification standards for administrators holding local, intermediate and state educational positions. Certification practices may vary from one state to another but should operate in a manner which promotes a high level of competence.

Representatives of higher education, local school organizations, professional administrative organizations and state/federal education agencies should cooperatively design new standards for certification. These standards should be flexible and renewed periodically to meet the changing needs of administration.

Identification and Development of Personnel

Competency and the potential for administrative competency should be a primary consideration in the expansion of the talent pool. Identification and certification procedures for school administrators should allow for active consideration of candidates from among those under-represented population groups.

Persons who show an aptitude for administration and who give evidence of interest in professional preparation should be encouraged. Particular attention should be given to the personal characteristics of such candidates.

Colleges and universities in their work with undergraduates and local education agencies in their work with staff bear primary responsibility for the identification and encouragement of future administrators. School districts, as a matter of policy, should provide for development leave and other types of released time for practical involvement in management functions.

Universities, school districts, and other agencies are encouraged to develop supplemental scholarship opportunities to assist with the identification and development of administrative talent. AASA and other associations should expand their efforts to provide scholarship grants to promising persons whose professional goal is the improvement of their administrative skills.

Preparation and Training

Training institutions should involve practicing administrators in the design, development, operation and evaluation of the academic programs. The evaluation process should include feedback from students, monitoring by practitioners and accreditation by recognized state, regional and national agencies.

The academic program in school administration should have the characteristics of a professional school rather than the qualities of graduate study in a single academic discipline. This preparation should be performance based, field oriented, and incorporate concepts, theories, and research findings from other academic disciplines.

School leadership positions include a core of knowledge as well as common skills which are needed by people. In some instances preparation for entry level school leadership positions will not be distinguishabie from preparation for other

management positions. However, since some skills are peculiar to the superintendency, and others exclusive to different levels of management, preparation programs must provide for discrete features which relate to these specializations. The processes of administration will be stressed with emphasis upon both the cognitive basis of management science and skill development through laboratory preparation. These processes of leadership include: goal setting, planning, organizing, coordinating, communicating, directing, decision-making, evaluating organizational goals and working with the people involved in such processes.

Preparation of educational administrators should include an interdisciplinary approach under the jurisdiction of a school district or institution of higher education. Many fields of learning have contributions to make to the solution of educational leadership problems. Contributions from such broad fields as law, business and economics, science and the humanities can best be made when the representatives of those disciplines take an active part in the preparation of school administrators. High priority should also be placed on the ability to communicate as well as an understanding and working knowledge of the uses of the various forms of communication.

Preparing institutions should provide flexibility in academic programs to accommodate the need for independent study arrangements and the use of various activities which recognize the difference in student backgrounds and career aspirations.

Preparation programs should include theory and practice in organizational behavior. The

administrator must be prepared to recognize and respond sensitively and constructively to the diversity of values represented in our pluralistic society.

Administrator preparation programs should include specific attention to and the relationships involved in working with a board of education.

School administrators should be specifically and technically prepared in the tools of research to deal effectively with needs assessment, short and long range planning, goal setting and the achievement of specific educational objectives. Administrators should be prepared to deal effectively with the problems of analysis and interpretation, the forecasting of consequences, and the formulation of alternatives. Policy research/analysis/administration should be the tools by which practitioners exercise leadership.

Preparing institutions should be encouraged to state clearly the performance objectives they are seeking to achieve, the measures they will accept as indicators of performance, the evaluative criteria they will use and the types of evidence needed to assess results.

The use of interrelated bases for determining performance oriented program objectives should be encouraged, including: social and educational needs to be met through leadership; the critical leadership behaviors required; the tasks and functions to be performed in different administrative assignments; and the competencies required to perform such functions.

Recognition should be given to the need to design and implement programs to prepare personnel for educational leadership positions not yet in existence or widely prevalent.

Cooperating school systems and other educational agencies should seek to achieve clearer on-site analysis of administrator performances and better diagnostic data concerning staff development needs. This information should have a constructive impact on the improvement of the objectives of preparatory programs.

The accreditation status of the preparation program should be clearly and openly publicized.

Field Experiences —The Internship

Field experiences should be used to provide a practical, "hands-off" experience to allow the prospective administrator the opportunity to ascertain whether there is interest and desire to further pursue administrative experiences.

Continuous evaluation of the progress of interns by cooperating agencies and institutions will assure the intern's continued development.

A year long internship should be an essential and integral part of the preparation program for school administrators. Internship experiences, when jointly planned and supervised by local administrators and university personnel should provide the proper laboratory for diagnosing educational management problems and for proposing alternative courses of action.

Internships should be sufficiently flexible to accommodate different experience backgrounds and career aspirations. This flexibility should be assured through involvement of different organizational levels of school systems, professional organizations, state and national education and governmental agencies. Administrative interns should be provided opportunities to test their administrative skills in a variety of educational

settings and be given necessary time to plan appropriate courses of action.

Continuing Professional Development

Leaders should recognize the continual need to upgrade their knowledge and management skills in light of the development of new knowledge, new techniques and new interpretations of need.

The governing body of each national and/or state professional administrative organization and the administration of the preparation institution should mandate and financially support programs which require those involved to devote time each year to continuing education through graduate level seminars, organized scholarly study and individual research.

University personnel directly involved in the preparation programs of school administrators should continually update their experiential background.

Professional development activities should be flexible and adaptable to individual needs. NASE programs and other seminars, clinics and short courses should be organized around this premise. Colleges and universities should offer similar programs.

Professional development programs should be systematically evaluated by training institutions, professional organizations and participants to improve both relevancy and quality.

Afternote

While the Committee for the Advancement of School Administration recognizes that this document can be debated *ad infinitum* it is expected that such discussion will be beneficial to the profession and will lead to continual revision and improvement of the Guidelines.

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